[PROJECT NAME] UNACCOMPANIED ENLISTED PERSONNEL HOUSING (UEPH) COMPLEX

STATEMENT OF WORK

26 November 2001

U.S. ARMY CORPS OF ENGINEERS (Norfolk District)

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CHAPTER 1

DESIGN OBJECTIVES

1-1 **SCOPE OF WORK**. Design and construction shall comply with the specifications and requirements contained in this Request for Proposals (RFP). The design and technical criteria contained and cited in this RFP establish minimum standards for design and construction quality. The objective of this solicitation is to obtain a campus complex of buildings complete and adequate for assignment as unaccompanied enlisted personnel housing and support facilities. This contract shall consist of the design and construction of barracks, including common support spaces, for [insert number] soldiers, company operations facilities, battalion headquarters, brigade headquarters, site work, and associated facilities on Government-owned land at [installation and location].

1-1.1 **Site Area**. The site[s] is [are] described on the RFP drawings included as part of this solicitation and include[s] approximately [insert] hectares [___ acres].

1-1.2 **Site Work**. Site work includes all design and construction of site features described in the RFP, including but not limited to, site planning, clearing, grading, erosion control, site drainage, utility systems, pavements, pedestrian and vehicular circulation systems, outdoor recreation facilities, landscaping, physical security measures, fencing, and site furnishings.

1-1.3 **Special Utilities and Supplementary Construction**. [Insert special utility items, supplementary construction, on-site or off-site]

1-1.4 **Demolition Considerations and Requirements**. [Insert special items with respect to demolition requirements. Asbestos and lead paint surveys should be included as an attachment to the Statement of Work. It is also recommended to assign responsibility for preparing the asbestos and lead paint abatement guide specs to the industrial hygienist firm that completed the survey. If this is done, attach the edited guide spec to the SOW].

1-1.5 **Environmental Considerations and Mitigation Requirements**. [Insert requirements for remediation of site contamination, wetlands mitigation, etc. Environmental test data, reports and drawings should be included as an attachment to the RFP].

1-2 **APPLICABLE CRITERIA**. Applicable design and construction criteria references are listed in Appendix A to the Statement of Work. Criteria shall be taken from the most current references as of the date of issue of the RFP. Referenced codes and standards are minimum acceptable criteria. Administrative, contractual, and procedural features of the contract shall be as described in other sections of the RFP.

1-3 **DESIGN QUALITY.** The main objectives of this solicitation are to obtain a complex of unaccompanied enlisted personnel housing (UEPH) including support facilities and associated site development within funds available, and to maximize design quality. Design quality is achieved through the optimization of interior planning, integration of buildings with the site, sustainability, selection of building systems for low-cost maintenance and operation, and an overall balance of aesthetics and functionality.

1-4 **DESIGN FREEDOM**. Requirements stated in this RFP are minimums. Innovative, creative, or cost-saving proposals, which meet or exceed these requirements are encouraged

and will be considered more favorably. Designs may incorporate factory fabricated components or modules.

1-5 **ENERGY AND RESOURCES CONSERVING FEATURES**. Public Law 102-486, Executive Order 12902, and Federal Regulations 10 CFR 435, require federal buildings to be designed and constructed to reduce energy consumption in a life-cycle, cost-effective manner using renewable energy sources when economical. Products designed to conserve energy and resources by controlling the amounts of consumed energy or by operating at increased efficiencies should be considered. Minimum requirements for this project are listed in the Statement of Work.

1-6 **INSTALLATION REAL PROPERTY MASTER PLAN**. [Edit as applicable.] The installation real property master plan provides comprehensive documentation of the existing conditions of natural, man-made, and human resources. It also guides future land-use development. Design of this project shall incorporate the design guidance and criteria contained in the [name of installation] Real Property Master Plan, excerpts of which are contained in an attachment to the Statement of Work.

1-7 **INSTALLATION DESIGN GUIDE**. [Edit as applicable.] Design of this project shall incorporate the design guidance and criteria contained in the [name of installation] Installation Design Guide, excerpts of which are contained in an attachment to the Statement of Work.

1-8 **ACCESSIBILITY REQUIREMENTS**. All areas and facilities required to be accessible to physically disabled persons shall conform to the Uniform Federal Accessibility Standards (UFAS) Federal Standard 795, and the Americans With Disabilities Act Accessibility Guidelines (ADAAG). Able-bodied military personnel shall occupy UEPH living units, thus provisions for the disabled are not required within the living units. The following areas shall be accessible:

1-8.1 Areas that may be used by non-military employees or visitors. Specific areas are indicated in the Statement of Work.

1-8.2 Handicap accessible visitor and non-military employee parking spaces near UEPH and other buildings as indicated in Chapter 3 of the Statement of Work.

1-8.3 Minimum of one accessible pedestrian route linking handicap accessible parking areas with accessible building entrances.

1-9 **FORCE PROTECTION & ANTI-TERRORISM CONSIDERATIONS**. Project design and construction shall comply with the latest edition of the Interim Department of Defense Anti-Terrorism / Force Protection Construction Standards, excerpts of which are contained in an attachment to the Statement of Work. [Design District shall investigate additional applicable requirements and insert into the Statement of Work as needed. Consider including items such as IDG excerpts in separate folders on the RFP compact disk or website.]

1-10 **ORGANIZATIONAL STRUCTURE**. The housing facilities designed and constructed under this solicitation will be occupied by enlisted soldiers. Each soldier is assigned to a company. Company operations facilities will accommodate the day-to-day functions of the company, including storage of the company's gear and arms, locker/shower facilities for use by soldiers after physical training, and spaces for administration and command of the company. Company operations facilities will be used by enlisted personnel residing in the UEPH facilities, enlisted personnel living in family housing areas, and non-enlisted personnel.

A number of companies comprise a battalion. Battalion headquarters house the administrative and command functions of the battalion, and provide training and support areas for soldiers. A brigade is composed of a number of battalions. Brigade headquarters house the administrative and command functions of the brigade.

CHAPTER 2

FUNCTIONAL AND AREA REQUIREMENTS

2-1 GENERAL REQUIREMENTS

2-1.1 **Gross building area definition**. Gross building area is measured to the outside face of exterior enclosure walls. Gross area includes floor areas, penthouses, mezzanines, and other spaces as follows:

2-1.1.1 **Areas calculated as half space**. Gross area includes one-half the area of exterior covered areas such as balconies, entries, loading platforms, breezeways, exterior corridors, and porches. Exterior covered areas are measured from the face of the enclosure wall to the edge of the covered area served. Stairs (enclosed or open) and elevator shafts count as half space for each floor they serve. In UEPH buildings only, interior public corridors will be calculated as half space (circulation spaces *within* the living unit will be calculated as full area).

2-1.1.2 **Excluded space**. The following spaces are excluded from gross area calculations: Attic areas where average clear height does not exceed 2.13m [7 feet]; crawl spaces; exterior uncovered loading platforms; open courtyards; normal roof overhangs and soffits for weather protection; uncovered ramps and steps; utility tunnels; raceways; mechanical equipment platforms and catwalks.

2-1.2 **Gross area limitations**. Maximum authorized gross building areas for each facility are included in this paragraph. Proposals that exceed authorized gross area limitations may be considered non-conforming.

2-1.3 **Net area definition**. Net area is measured to the inside face of the room or space walls.

2-1.4 **Net Area Requirements**. Net area requirements for programmed spaces are included in this chapter. If net area requirements are not specified in the Statement of Work, the space shall be sized to: accommodate the required function, comply with code requirements, comply with overall gross area limitations and other requirements of the RFP (for example, area requirements for corridors, stairs, and mechanical rooms will typically be left to the discretion of the offeror).

2-1.5 **Functionality**. Rooms shall be sized and arranged for efficient use, circulation, and furniture placement.

2-1.6 **Finish Requirements**. Room finishes stated in the following paragraphs are preferred minimums; finish selections are not limited to those listed.

2-1.7 **Furniture Requirements**. [Early in the project programming process, the RFP preparation team must determine the scope of interior furnishings (tables, chairs, beds, etc.) that will be required to be provided by the offerors. Subject to funding requirements, the RFP may be written so that furnishings are not provided by the offeror (the more traditional approach), or the RFP may be written to require offerors to provide a completely furnished, turnkey, building. Functional and area requirements in this model SOW require the offeror to "provide and design the space to accommodate" furnishings that would typically occur in some spaces; furniture requirements for other spaces are to be identified by the RFP preparation

team. In either case, careful coordination with the using activity is necessary prior to issuance of the RFP. If the provision of furniture is to be included in the RFP, specific furniture criteria such as acceptable materials, finishes and quality levels must be added to the SOW.]

2-2 **UEPH FACILITIES FUNCTIONAL AND AREA REQUIREMENTS.** The UEPH building(s) shall consist of living units, common areas, and support spaces. Each living unit shall be designed to be occupied by one or two soldiers. Provide [___] Two-person living units [and ___ One-person living units] to house a total of [___]enlisted personnel. Living units and common areas may comprise a single building, or multiple buildings. Total gross building area of UEPH buildings shall not exceed [_____] square meters (m^2) [_____ square feet (sf)] [Maximum gross area is limited to 34 m^2 per soldier (36 m^2 per soldier for high-rise facilities (over three stories) or to meet other site specific requirements); this includes living units, common areas, and support spaces in the UEPH buildings. Maximum gross area shall be as shown on form DD 1391.]. **The successful design scheme will maximize the area of the living units, provide the required support and common areas, and strictly comply with the overall gross building area limitation.** Building spaces and areas shall be as follows:

2-2.1 **Areas Comprising the Two-Person Living Unit (Module)**. Each Two-Person living unit, or module, will contain two individual living/sleeping rooms with closets, and some combination of a shared or private service area with kitchenette, and a shared or private bathroom. Spaces are as follows.

2-2.1.1 **Individual Living/Sleeping Room**. Minimum net area 13 m^2 [140 sf]. Maximum net area 17 m^2 [182 sf]. Provide two per module.

2-2.1.1.1 Function: Private bedroom and living space for one enlisted person.

2-2.1.1.2 Adjacency requirements: Adjacent to service area and closet. Living/sleeping room shall be entered from service area, or the public interior corridor or breezeway. Provide 750mm [2'-6"] wide door between service area and living/sleeping room. If living/sleeping room is entered directly from interior corridor or breezeway, provide 900mm [3'-0"] wide entry door swinging into room.

2-2.1.1.3 Furnishings/Fixtures/Equipment: Provide, and design the room to accommodate, the following furnishings: One twin bed with headboard and footboard 102mm x 2083mm [40" x 85"]; one entertainment center for occupant's television and sound system 864mm wide x 635mm deep x 1930mm high [34" x 25" x 76"]; one chest of drawers 712mm wide x 458mm deep x 661mm high [28" x 18" x 26" high]; one nightstand 485mm wide x 435mm deep x 535mm high [19" x 17" x 21" high]; one desk 1524mm wide x 762 deep (with keyboard tray retracted) x 762mm high [60" wide x 30" deep x 30" high]; and one desk chair 500mm wide x 535mm deep x 851mm high [19-1/2" x 21" x 33-1/2" high]. .

2-2.1.1.4 Minimum Finishes:
Floor: vinyl composition tile
Base: wood or resilient cove base
Walls: painted gypsum wallboard or painted veneer plaster
Ceiling: painted gypsum wallboard, painted veneer plaster, or painted underside of precast concrete structural floor planks

2-2.1.1.5 Other requirements: Living/sleeping room shall have at least one exterior operable window with insect screen. Window shall meet egress requirements of NFPA 101 and

International Building Code. Window shall not be located adjacent to an exterior corridor or breezeway. Door between service area and living/sleeping room shall have entry function (F82) lockset (living/sleeping room is secure side). If provided, door between public corridor and living/sleeping room shall have mortise dormitory function (F13) lockset. Provide minimum of one combination telephone/data outlet in each Living /Sleeping room. Provide minimum of one cable television outlet in each Living/Sleeping room. Coordinate outlet locations with furniture arrangement. Refer to Chapter 9 Electrical Systems

2-2.1.2 **Closet**. Minimum net area 3 m^2 [32.3 sf]. Provide one per living/sleeping room.

2-2.1.2.1 Function: Private walk-in closet for clothing and storage of boxes and field gear.

2-2.1.2.2 Adjacency requirements: Adjacent to living/sleeping room. Provide minimum 700mm [2'-4"] wide door between living/sleeping room and closet.

2-2.1.2.3 Furnishings/Fixtures/Equipment (FFE): Provide minimum 2 linear meters [6'-7"] of rod and shelf.

2-2.1.2.4 Minimum Finishes:
Floor: vinyl composition tile
Base: wood or resilient cove base
Walls: painted gypsum wallboard or painted veneer plaster
Ceiling: painted gypsum wallboard, painted veneer plaster, or painted underside of precast concrete structural floor planks.

2-2.1.2.5 Other requirements: Door shall have privacy function (F76) lockset, or be equipped with a hasp so the occupant can provide his/her own padlock.

2-2.1.3 **Service Area**. Provide one per module.

2-2.1.3.1 Function: Circulation space, food preparation area, [area for washer and dryer,] and eating area for occupants.

2-2.1.3.2 Adjacency requirements: Adjacent to living/sleeping rooms and bathroom. If service area is entered from public corridor or breezeway, provide 900mm [3'-0"] wide entry door swinging into room

2-2.1.3.3 Furnishings/Fixtures/Equipment: Provide refrigerator-freezer (minimum 9 total cubic feet). Provide microwave oven (min .9 cubic feet, 800 watts) mounted under wall cabinets. Provide minimum 2-burner electric cooktop, or 2-burner electric range with self-cleaning oven. Provide range hood with exterior exhaust. Provide minimum 1500 linear mm [5'-0"] of 600mm [2'-0"] deep kitchen base cabinets and countertop (including cooktop/range width), and 2100 linear mm [7'-0"] of 300mm [12"] deep wall cabinets. Wall cabinets shall be minimum 600mm [2'-0"] high; provide 600 mm [2'-0"] clear between countertop and bottom of wall cabinets at sink. Base cabinets shall have minimum of two 300 mm [12"] wide drawers. Provide plastic laminate countertop with side and backsplashes at walls. Provide single compartment, stainless steel kitchen sink with food strainer/stopper, minimum inside dimensions 400mm x 400mm x 175mm deep [1'-4" x 1'-4" x 7" deep], with chrome-plated, single handle, washerless mixing faucet (refer to Chapter 8). Provide, and design room to accommodate, the following furnishings: one dining table for two persons, 750mm square x 725mm high [30" x 28-1/2" high] with two armless dining chairs. Provide fire extinguisher mounted inside base cabinet.

Providing residential type clothes washer and dryer in each living unit is a HQ approved option. If the design district is considering use for this project, coordination with user and installation facilities engineer (DPW) is essential. Carefully weigh the benefits and drawbacks of providing laundry appliances in each unit. Appliances shall be Energy Star compliant. Note, also, that for optimum performance and minimum maintenance and fire hazard, dryers should exhaust to the exterior with as little ductwork as possible; this puts additional design parameters on the arrangement of the floor plan of the units

2-2.1.3.4 Minimum Finishes:
Floor: vinyl composition tile
Base: resilient cove base
Walls: painted gypsum wallboard or painted veneer plaster
Wall area between countertop and wall cabinets: ceramic tile, plastic laminate, or color coordinated back wall shield (if unitized kitchen is used)
Ceiling: painted gypsum wallboard, painted veneer plaster, or painted underside of precast concrete structural floor planks

2-2.1.3.5 Other requirements: At wall areas around dining table provide chair rail or similar wall protection to protect walls from chair and table impact. It is desirable, but not required, to have exterior window in room. Window shall not be located adjacent to an exterior corridor or breezeway. Door between public corridor and service area (entry door into module) shall have mortise dormitory function (F13) lockset.

2-2.1.4 **Bathroom**. Provide minimum of one bathroom per module.

2-2.1.4.1 Function: Bathing and toilet facilities for either occupant; storage for both occupants' bath articles.

2-2.1.4.2 Adjacency requirements: Adjacent to service area or interior hallway. Provide 600mm [2'-0"] wide door between bathroom and service area or hallway.

2-2.1.4.3 Furnishings/Fixtures/Equipment (FFE): Lavatory shall be minimum 475mm x 475mm [19" x 19"] self-rimming vitreous china, or cast-filled acrylic or solid surfacing material integrally molded to countertop. Provide chrome-plated washerless faucet with pop-up drain (refer to Chapter 8). Countertop shall be minimum 900mm [3'-0"] wide cast-filled acrylic, acrylic solid surfacing material, or plastic laminate with integrally molded, 100mm high coved backsplash. Provide 100mm high side splash at side walls. Provide plastic laminate surfaced vanity base cabinet with hinged door(s) and minimum two 225mm [9"] wide drawers. Provide 6mm [1/4"] thick x minimum 1050mm [3'-6"] high mirror glass, full width of vanity countertop, with wall mounted vanity light fixture above mirror (refer to Chapter 9). Provide one recessed medicine cabinet, two soap holders, two toothbrush/tumbler holders. Provide floor mounted toilet with full seat and seat cover (lid). Provide bathtub, chrome-plated brass showerhead, and anti-scald single-handle mixing valve (refer to Chapter 8). Provide two minimum 600mm [2'-0"] long towel bars mounted on walls outside tub/shower enclosure, two wall mounted soap holders in the tub/shower, and one door mounted robe hook with two hooks. Provide wall mounted retractable clothesline across tub/shower. Provide mildew-resistant vinyl shower curtain with stainless steel curtain hooks and chrome-plated brass shower curtain rod. Provide single roll toilet tissue dispenser.

2-2.1.4.4 Minimum Finishes:
Floor: ceramic tile

Base: ceramic tile sanitary cove base
Walls: painted water-resistant gypsum wallboard or painted veneer plaster, or ceramic tile, or ceramic tile wainscot. Walls around shower/tub enclosure shall be full height ceramic tile, or material with equivalent scratch-resistance, water-resistance, and durability.
Ceiling: painted exterior gypsum soffit board, or painted veneer plaster, painted Portland cement plaster, or painted underside of precast concrete structural floor planks.

2-2.1.4.5 Other requirements: HVAC system shall exhaust bathroom air; refer to Chapter 10. Door shall have privacy function (F76) lockset.

2-2.1.5 **Module Mechanical Area**. Mechanical units may be located above ceilings, or in separate mechanical closets; or through-wall packaged units may be used. Refer to Chapter 10. If mechanical closet is provided, the following requirements will apply:

2-2.1.5.1 Function: Houses HVAC unit for the module. Room shall not be used for storage or any purpose not related to the mechanical system. Access will be limited to maintenance personnel.

2-2.1.5.2 Adjacency requirements: Adjacent to and accessible only from exterior or public corridor or breezeway.

2-2.1.5.3 Furnishings/Fixtures/Equipment: Provide mechanical system. Refer to Chapter 10.

2-2.1.5.4 Minimum Finishes:
Floor: sealed concrete
Base: none required
Walls: painted gypsum wallboard, painted veneer plaster, or painted concrete masonry units.
Ceiling: : painted gypsum wallboard, or painted veneer plaster, or painted underside of precast concrete structural floor planks

2-2.1.5.5 Other requirements: Provide swinging door sized to allow maintenance and removal of mechanical unit(s). Door shall have storeroom function (F86) lockset. Room construction shall comply with fire and smoke separation requirements of applicable codes.

2-2.2 **Areas Comprising the <u>One-Person Living Unit</u> (Module)**. Each One-Person living unit, or module, will contain a living/sleeping room with closet, a service area with kitchenette, and a bathroom. Spaces are as follows.

2-2.2.1 **Living/Sleeping Room**. Minimum net area 13 m2 [140 sf]. Maximum net area 17 m2 [182 sf]. Provide one per module.

2-2.2.1.1 Function: Private bedroom and living space for one senior enlisted person.

2-2.2.1.2 Adjacency requirements: Adjacent to service area and closet. Living/sleeping room shall be entered from service area, or the public interior corridor or breezeway. 750mm [2'-6"] wide door between service area and living/sleeping room may be provided, or room may be arranged like an efficiency apartment without door between kitchenette and living/sleeping area. If living/sleeping room is entered directly from interior corridor or breezeway, provide 900mm [3'-0"] wide entry door swinging into room.

2-2.2.1.3 Furnishings/Fixtures/Equipment: Provide, and design the room to accommodate,

the following furnishings: One twin bed with headboard and footboard 102mm x 2083mm [40" x 85"]; one entertainment center for occupant's television and sound system 864mm wide x 635mm deep x 1930mm high [34" x 25" x 76"]; one chest of drawers 712mm wide x 458mm deep x 661mm high [28" x 18" x 26" high]; one nightstand 485mm wide x 435mm deep x 535mm high [19" x 17" x 21" high]; one desk 1524mm wide x 762 deep (with keyboard tray retracted) x 762mm high [60" wide x 30" deep x 30" high]; and one desk chair 500mm wide x 535mm deep x 851mm high [19-1/2" x 21" x 33-1/2" high].

2-2.2.1.4 Minimum Finishes:
Floor: vinyl composition tile
Base: wood or resilient cove base
Walls: painted gypsum wallboard or painted veneer plaster
Ceiling: painted gypsum wallboard, painted veneer plaster, or painted underside of precast concrete structural floor planks

2-2.2.1.5 Other requirements: Living/sleeping room shall have at least one exterior operable window with insect screen. Window shall meet egress requirements of NFPA 101 and International Building Code. Window shall not be located adjacent to an exterior corridor or breezeway. Door between service area and living/sleeping room shall have passage function (F75) latchset. Door between public corridor and living/sleeping room shall have mortise dormitory function (F13) lockset. Provide minimum of one combination telephone/data outlet on in each Living /Sleeping room. Provide minimum of one cable television outlet in each Living/Sleeping room. Coordinate outlet locations with furniture arrangement. Refer to Chapter 9 Electrical Systems.

2-2.2.2 **Closet**. Minimum net area 3 m^2 [32.3 sf]. Provide one.

2-2.2.2.1 Function: Private walk-in closet for clothing and storage of boxes and field gear.

2-2.2.2.2 Adjacency requirements: Adjacent to Living/sleeping room. Provide minimum 700mm [2'-4"] wide door between living/sleeping room and closet.

2-2.2.2.3 Furnishings/Fixtures/Equipment (FFE): Provide minimum 2 linear meters [6'-7"] of rod and shelf.

2-2.2.2.4 Minimum Finishes:
Floor: vinyl composition tile
Base: wood or resilient cove base
Walls: painted gypsum wallboard or painted veneer plaster
Ceiling: painted gypsum wallboard, painted veneer plaster, or painted underside of precast concrete structural floor planks.

2-2.1.2.5 Other requirements: Door shall have privacy function (F76) lockset, or be equipped with a hasp so the occupant can provide his/her own padlock.

2-2.2.3 **Service Area**. Provide one per module. Service Area may be a separate room, or may be integrated into Living/sleeping room as in an efficiency apartment.

2-2.2.3.1 Function: Circulation space, food preparation area, [area for washer and dryer], and eating area for occupant and visitors.

2-2.2.3.2 Adjacency requirements: Adjacent to Living/sleeping room and bathroom. If Service Area is entered from public corridor or breezeway, provide 900mm [3'-0"] wide entry door swinging into room

2-2.2.3.3 Furnishings/Fixtures/Equipment: Provide refrigerator-freezer (minimum 9 total cubic feet). Provide microwave oven (min .9 cubic feet, 800 watts) mounted under wall cabinets. Provide minimum 2-burner electric cooktop, or 2-burner electric range with self-cleaning oven. Provide range hood with exterior exhaust. Provide minimum 1500 linear mm [5'-0"] of 600mm [2'-0"] deep kitchen base cabinets and countertop (including cooktop/range width), and 2100 linear mm [7'-0"] of 300mm [12"] deep wall cabinets. Wall cabinets shall be minimum 600mm [2'-0"] high; provide 600 mm [2'-0"] clear between countertop and bottom of wall cabinets at sink. Base cabinets shall have minimum of two 300 mm [12"] wide drawers. Provide plastic laminate countertop with side and backsplashes at walls. Provide single compartment, stainless steel kitchen sink with food strainer/stopper, minimum inside dimensions 400mm x 400mm x 175mm deep [1'-4" x 1'-4" x 7" deep], with chrome-plated, single handle, washerless mixing faucet (refer to Chapter 8). Provide, and design room to accommodate, the following furnishings: one dining table for two persons, 750mm square x 725mm high [30" x 28-1/2" high] with two armless dining chairs. Provide fire extinguisher mounted inside base cabinet. [Providing residential type clothes washer and dryer in each living unit is a HQ approved option. If the design district is considering use for this project, coordination with user and installation facilities engineer (DPW) is essential. Carefully weigh the benefits and drawbacks of providing laundry appliances in each unit. Appliances shall be Energy Star compliant. Note, also, that for optimum performance and minimum maintenance and fire hazard, dryers should exhaust to the exterior with as little ductwork as possible; this puts additional design parameters on the arrangement of the floor plan of the units].

2-2.2.3.4 Minimum Finishes:
Floor: vinyl composition tile
Base: resilient cove base
Walls: painted gypsum wallboard or painted veneer plaster
Wall area between countertop and wall cabinets: ceramic tile, plastic laminate, or color coordinated back wall shield (if unitized kitchen is used)
Ceiling: painted gypsum wallboard, painted veneer plaster, or painted underside of precast concrete structural floor planks

2-2.2.3.5 Other requirements: At wall areas around dining table provide chair rail or similar wall protection to protect walls from chair and table impact. It is desirable, but not required, to have exterior window in room. Window shall not be located adjacent to an exterior corridor or breezeway. Door between public corridor and service area (entry door into module) shall have mortise dormitory function (F13) lockset.

2-2.2.4 **Bathroom**. Provide one per module.

2-2.2.4.1 Function: Bathing and toilet facilities for occupant; storage for occupants' bath articles.

2-2.2.4.2 Adjacency requirements: Adjacent to service area or interior hallway. Provide 600mm [2'-0"] wide door between bathroom and service area or hallway.

2-2.2.4.3 Furnishings/Fixtures/Equipment (FFE): Lavatory shall be minimum 475mm x 475mm [19" x 19"] self-rimming vitreous china, or cast-filled acrylic or solid surfacing material integrally

molded to countertop. Provide chrome-plated washerless faucet with pop-up drain (refer to Chapter 8). Countertop shall be minimum 900mm [3'-0"] wide cast-filled acrylic, acrylic solid surfacing material, or plastic laminate with integrally molded, 100mm high coved backsplash. Provide 100mm high side splash at side walls. Provide plastic laminate surfaced vanity base cabinet with hinged door(s) and minimum two 225mm [9"] wide drawers. Provide 6mm [1/4"] thick x minimum 1050mm [3'-6"] high mirror glass, full width of vanity countertop, with wall mounted vanity light fixture above mirror (refer to Chapter 9). Provide one recessed medicine cabinet, one soap holder, one toothbrush/tumbler holder. Provide floor mounted toilet with full seat and seat cover (lid). Provide bathtub, chrome-plated brass showerhead, and anti-scald single-handle mixing valve (refer to Chapter 8). Provide two minimum 600mm [2'-0"] long towel bars mounted on walls outside tub/shower enclosure, one wall mounted soap holder in the tub/shower, and one door mounted robe hook with two hooks. Provide wall mounted retractable clothesline across tub/shower. Provide mildew-resistant vinyl shower curtain with stainless steel curtain hooks and chrome-plated brass shower curtain rod. Provide single roll toilet tissue dispenser.

2-2.2.4.4 Minimum Finishes:
Floor: ceramic tile
Base: ceramic tile sanitary cove base
Walls: painted water-resistant gypsum wallboard or painted veneer plaster, or ceramic tile, or ceramic tile wainscot. Walls around shower/tub enclosure shall be full height ceramic tile, or material with equivalent scratch-resistance, water-resistance, and durability.
Ceiling: painted exterior gypsum soffit board, or painted veneer plaster, painted Portland cement plaster, or painted underside of precast concrete structural floor planks.

2-2.2.4.5 Other requirements: HVAC system shall exhaust bathroom air; refer to Chapter 10. Door shall have privacy function (F76) lockset.

2-2.2.5 **Module Mechanical Area**. Mechanical units may be located above ceilings, or in separate mechanical closets; or through-wall packaged units may be used. Refer to Chapter 10. If mechanical closet is provided, the following requirements will apply:

2-2.2.5.1 Function: Houses HVAC unit for the module. Room shall not be used for storage or any purpose not related to the mechanical system. Access will be limited to maintenance personnel.

2-2.2.5.2 Adjacency requirements: Adjacent to and accessible only from exterior or public corridor or breezeway.

2-2.2.5.3 Furnishings/Fixtures/Equipment: Provide mechanical system. Refer to Chapter 10.

2-2.2.5.4 Minimum Finishes:
Floor: sealed concrete
Base: none required
Walls: painted gypsum wallboard, painted veneer plaster, or painted concrete masonry units.
Ceiling: painted gypsum wallboard, or painted veneer plaster, or painted underside of precast concrete structural floor planks

2-2.2.5.5 Other requirements: Provide swinging door sized to allow maintenance and removal of mechanical unit(s). Door shall have storeroom function (F86) lockset. Room construction shall comply with fire and smoke separation requirements of applicable codes.

2-2.3 **UEPH Common Areas**. Common areas may be located within a building containing living units, or in a separate building. [Note: common area sizes and requirements listed below are based on what is required for a 192 to 288-person UEPH facility. It is assumed that the UEPH campus will arrange living units in groups not to exceed 144 units. RFP preparers should review and adjust the quantity and size of common areas to reflect the desired grouping of living units]. Entry lobby, CQ station, toilet room, mail room, public telephones, and vending area should be grouped together at the main entrance to the barracks, adjacent to visitor parking area. Spaces are as follows:

2-2.3.1 **Entry Lobby**. Provide one.

2-2.3.1.1 Function: Primary entry point into the UEPH facility; waiting area for visitors.

2-2.3.1.2 Adjacency requirements: Adjacent to main entry to UEPH facility. It is preferable to enter lobby area from two sides of building.

2-2.3.1.3 Furnishings/Fixtures/Equipment: Provide and design space to accommodate a minimal waiting-area with space for seating. Provide ceiling or wall mounted television bracket with locking tray. Arrange seating to allow viewing of television (TV is government furnished, government installed). Provide wall mounted electric water cooler.

2-2.3.1.4 Minimum Finishes:
Floor: porcelain tile, or quarry tile.
Base: porcelain tile or quarry tile, or stained wood base.
Walls: painted gypsum wallboard, or painted veneer plaster.
Ceiling: suspended acoustical panel ceiling, painted gypsum wallboard, painted veneer plaster, painted Portland cement plaster, or painted underside of precast concrete structural floor planks.

2-2.3.1.5 Other requirements: Handicap accessible. Provide conduit and junction box for cable television service to wall or ceiling mounted television.

2-2.3.2 **Entry Vestibules**. Provide at each exterior entrance to lobby area. [If climate dictates, revise this sentence to require vestibules at all entrances to the building.]

2-2.3.2.1 Function: Primary entry point into the UEPH facility; weather protection for interior spaces.

2-2.3.2.2 Adjacency requirements: Adjacent to lobby.

2-2.3.2.3 Furnishings/Fixtures/Equipment:

2-2.3.2.4 Minimum Finishes:
Floor: porcelain tile, or quarry tile
Base: porcelain tile or quarry tile
Walls: Match exterior wall finish material (preferred), or painted gypsum wallboard, or painted veneer plaster
Ceiling: painted gypsum wallboard, painted veneer plaster, painted Portland cement plaster, or painted underside of precast concrete structural floor planks.

2-2.3.2.5 Other requirements: Handicap accessible.

2-2.3.3 **Charge of Quarters (CQ) Station**. Provide one area, approximately 6.5 m^2 [70 sf].

2-2.3.3.1 Function: Reception area for visitors; duty desk for barracks manager.

2-2.3.3.2 Adjacency requirements: Adjacent to lobby and main entry. Locate to allow observation of lobby, main entry, public telephones, and common outdoor areas.

2-2.3.3.3 Furnishings/Fixtures/Equipment: Provide reception desk (built-in casework) minimum 2400 mm [8'-0"] long, to accommodate computer and monitor (not in contract), security system monitor, telephone, writing area. Provide built-in communication and power receptacles. Desk shall have minimum two legal size file drawers and one pencil drawer. All drawers shall have locks. Desk components shall have plastic laminate or stained wood finish. Work surfaces and counters shall be solid surfacing material or plastic laminate.

2-2.3.3.4 Minimum Finishes: Match entry lobby.

2-2.3.3.5 Other requirements: Handicap accessible.

2-2.3.4 **Main Stair**. Provide as required to allow circulation from lobby to all upper floors, and to comply with applicable code egress requirements. If allowable by applicable code, it is preferable to provide a main (monumental) stair that is open to the lobby.

2-2.3.4.1 Function: Central vertical circulation for the building. Means of egress if so designed.

2-2.3.4.2 Adjacency requirements: Adjacent to entry lobby. Connects all floors of the building.

2-2.3.4.3 Furnishings/Fixtures/Equipment (FFE): Stairs shall be steel construction with concrete-filled treads, or cast-in-place concrete construction. Open risers are prohibited. Provide decorative trim and detailing to integrate stair into lobby design. Provide metal railing or other guardrail system between open stair and adjacent spaces. Provide mechanical and electrical systems to comply with applicable codes.

2-2.3.4.4 Minimum Finishes: Landing floors: carpet, porcelain tile, quarry tile, or resilient tile.
Base: porcelain tile, quarry tile, or resilient cove base.
Treads: carpet, porcelain tile, quarry tile, or resilient treads. Provide slip-resistant nosing if tile is used.
Risers: carpet, painted steel, porcelain tile, or quarry tile
Walls: impact resistant gypsum wallboard with vinyl wallcovering or painted finish; Prefinished or painted metal railings.
Ceiling: suspended acoustical panel ceiling, painted gypsum wallboard, painted veneer plaster, painted Portland cement plaster, or painted underside of precast concrete structural floor planks

2-2.3.4.5 Other requirements: Handicap accessible.

2-2.3.5 **Toilet Rooms**. Preference is for separate male and female toilet rooms, however, a single unisex room is the minimum requirement.

2-2.3.5.1 Function: Private, handicap accessible toilet for use by visitors and CQ.

2-2.3.5.2 Adjacency requirements: Adjacent to entry lobby and CQ station.

2-2.3.5.3 Furnishings/Fixtures/Equipment: Floor mounted toilet; wall hung lavatory; recessed multifold paper towel dispenser/trash receptacle; two roll toilet tissue dispenser; sanitary napkin disposal; liquid soap dispenser; wall mounted mirror over lavatory; wall mounted grab bars at toilet.

2-2.3.5.4 Minimum Finishes:
Floor: Ceramic tile, or porcelain tile
Base: Ceramic tile, or porcelain tile
Walls: Ceramic tile, ceramic tile wainscot, or painted water-resistant gypsum wallboard
Ceiling: painted gypsum wallboard, painted veneer plaster, painted portland cement plaster, or painted underside of precast concrete structural floor planks.

2-2.3.5.5 Other requirements: Handicap accessible. Entry door shall have privacy function (F76) lockset.

2-2.3.6 **Janitor Closet**. Provide one on each floor of building. Minimum area 2.8 m^2 [30 sf] each.

2-2.3.6.1 Function: Sink, and storage of cleaning supplies.

2-2.3.6.2 Adjacency requirements: Near toilet room on first floor; preferred location on upper floors is adjacent to laundry areas.

2-2.3.6.3 Furnishings/Fixtures/Equipment: Provide floor mop sink, mop rack for three mops, and minimum 1800 linear mm of wall mounted stainless steel shelving.

2-2.3.6.4 Minimum Finishes:
Floor: ceramic tile, or sealed concrete
Base: resilient cove base, or ceramic tile base
Walls: painted water-resistant gypsum wallboard, or painted concrete masonry units
Ceiling: painted gypsum wallboard, painted veneer plaster, or painted underside of precast concrete structural floor planks.

2-2.2.6.5 Other requirements: door shall have classroom function (f84) lockset.

2-2.3.7 **Vending Area**. Provide minimum one area on ground floor. Additional vending areas with ice machine-dispensers may be provided at upper floors as a proposed betterment over the minimum requirement. [If climate allows, consider the possibility of allowing vending machines and ice machine-dispensers to be located in securable outdoor areas. Ice dispensers may require card key type access control or coin operation if located in an unsupervised area.]

2-2.3.7.1 Function: Space for soft drink and snack vending machines, and ice machine-dispenser.

2-2.3.7.2 Adjacency requirements: Near entry lobby.

2-2.3.7.3 Furnishings/Fixtures/Equipment: Provide one ice cube machine-dispenser designed for hotel ice bucket filling, capable of producing minimum 250 lbs. of regular ice cubes in 24 hours, with 180 lb. storage capacity [Add requirement for room card type access or coin operation of ice dispenser if desired]. Provide ice machine manufacturer's automatic cleaning

system to clean and sanitize the water distribution system of the machine at scheduled intervals. Ice machine shall be Energy Star compliant. Design the space to accommodate four full-size soft drink and snack vending machines (government furnished, government installed). Vending machines will not require plumbing connections.

2-2.3.7.4 Minimum Finishes: Match entry lobby or adjacent corridor or breezeway.

2-2.3.7.5 Other requirements: First floor vending areas shall be handicap accessible. Provide floor drain near ice machines; locate drain outside of traffic area. If door is provided, door shall have classroom function (F84) lockset.

2-2.3.8 **Public Telephone Area**. Provide one. [If climate allows, consider the possibility of locating additional pay telephones in outdoor kiosks or phone booths. Require coordination of kiosk design with UEPH building design and the Installation Design Guide. Include applicable requirements of the IDG in this Statement of Work.]

2-2.3.8.1 Function: Pay telephones for barracks occupants and visitors.

2-2.3.8.2 Adjacency requirements: Near lobby and CQ station.

2-2.3.8.3 Furnishings/Fixtures/Equipment: Provide three pay telephones and telephone stations. Offeror shall contract with local telephone company or other telephone service provider to furnish and install pay telephones; rate charged for calls shall not exceed the average prevailing rate in the local off-post community. Each station will have divider panels to enhance acoustical privacy. Provide built-in seating at two stations; third station shall be wheelchair accessible. Provide capability to mount portable TDD at one station. Materials shall be vandal resistant and easily cleaned.

2-2.3.8.4 Minimum Finishes: Match entry lobby.

2-2.3.8.5 Other requirements: Handicap accessible.

2-2.3.9 **Mail Room**. Provide one. Room shall be sized to allow access to all rear-loading mailboxes and parcel lockers. Provide minimum 1800 mm [6'-0"] clear between back of mailboxes and any obstructions. To comply with force protection minimum standards, avoid routing key utilities (including communications, fire detection and alarm, water mains, etc.) through or on common walls to mail room.

2-2.3.9.1 Function: Secure area for sorting incoming mail and distributing to rear-loading mailboxes.

2-2.3.9.2 Adjacency requirements: Near CQ station and entry lobby. To comply with force protection minimum standards, locate mailroom on perimeter of building.

2-2.3.9.3 Furnishings/Fixtures/Equipment: Provide plastic laminate-faced sorting counter (built-in casework) 750 mm [2'-6"] deep x minimum 2400 mm [8'-0"] long x 900 mm [3'-0"] high. Provide United States Postal Service approved mailbox for each living/sleeping space of the facility. Provide minimum of nine parcel lockers, and one outgoing mail collection box.

2-2.3.9.4 Minimum Finishes:
Floor: vinyl composition tile, or sealed concrete

Base: resilient cove base
Walls: painted gypsum wallboard or painted veneer plaster, or painted concrete masonry units
Ceiling: painted gypsum wallboard, painted veneer plaster, or painted underside of precast concrete structural floor planks.

2-2.3.9.5 Other requirements: Provide 900 mm [3'-0"] wide door into room; door shall have mortise dormitory function (F13) lockset. Room shall be handicap accessible. Design shall comply with United States Postal Service regulations.

2-2.3.10 **Mailbox Access Area**. Provide an area from which residents may access mailboxes to pick up their mail. Access may be from a covered exterior area or from an interior lobby. Mailboxes will be loaded from the interior mail room.

2-2.3.10.1 Function: Mail pickup area for residents.

2-2.3.10.2 Adjacency requirements: Adjacent to mail room. Located on ground floor, near CQ station and entry lobby.

2-2.3.10.3 Furnishings/Fixtures/Equipment:

2-2.3.10.4 Finishes: Interior: match entry lobby. Exterior: refer to exterior building material requirements.

2-2.3.10.5 Other requirements: For exterior location provide minimum 1800 mm [6'-0"] of covered area in front of mailboxes (recess, building overhang, etc.) for weather protection; it is preferable to provide continuous covered area between mailbox access area and main entry. Provide adequate drainage at exterior areas.

2-2.3.11 **Laundry Area(s)**. [Delete if washer and dryer is provided in each living unit] Provide a minimum of one clothes washer per 12 residents, and 1.5 clothes dryers per washer (round fractional numbers to the next highest whole number). Laundry facilities may be consolidated on the ground floor, dispersed to multiple floors, or located in each module (determine User preferences).

2-2.3.11.1 Function: Self-service washers and dryers and clothes folding areas for residents.

2-2.3.11.2 Adjacency requirements: Locate laundry rooms on exterior walls so dryers can be exhausted directly to exterior. Locate dryer exhaust wall caps away from operable windows. For noise considerations, it is preferable not to locate laundry rooms adjacent to living units (shared walls).

2-2.3.11.3 Furnishings/Fixtures/Equipment: Commercial quality clothes washers and dryers (each minimum 2.5 cubic feet capacity), non-coin operation. Stacked dryers are preferred. Appliances shall be Energy Star compliant. Provide one plastic laminate-faced table with clothes hanging rod (minimum table size:1200 mm x 600 mm x 900 mm high [48" x 24" x 36" high]) per each four washers.

2-2.3.11.4 Minimum Finishes:
Floor: porcelain tile, quarry tile, or sealed concrete
Base: porcelain tile or quarry tile
Walls: painted water resistant gypsum wallboard or painted veneer plaster, or painted concrete

masonry units
Ceiling: painted gypsum wallboard, painted veneer plaster, painted Portland cement plaster, or painted underside of precast concrete structural floor planks

2-2.3.11.5 Other requirements: Provide insulated glass storefront or sidelights at door to allow views into the room from the corridor. Conceal utilities from view, but provide easy maintenance access; locate utility connections 900 mm [36"] above finish floor, unless otherwise recommended by manufacturer. Provide one floor drain for every four washers; locate outside of traffic area. Provide direct straight-run venting of dryer exhaust. Partitions around laundry rooms shall have minimum STC of 45, and shall extend to underside of floor above. Provide 900 mm [3'-0"] wide door(s) into room. Doors shall have classroom function (F84) locksets (or exit devices if required by applicable code).

2-2.4 **UEPH Support Areas**. Support areas include circulation spaces such as stairs and corridors; mechanical, electrical, and communications spaces; boot wash facilities; and outdoor storage buildings. Spaces are as follows:

2-2.4.1 **Interior Corridor**. Provide as required to allow circulation to building spaces, and comply with applicable code egress requirements. Due to security, climate, and force protection concerns, interior corridors are the preferred means of circulation between living units and other building spaces.

2-2.4.1.1 Function: Circulation and means of egress.

2-2.4.1.2 Adjacency requirements: Adjacent to vertical circulation.

2-2.4.1.3 Furnishings/Fixtures/Equipment (FFE): Provide mechanical and electrical systems to comply with applicable codes. Provide fire extinguishers in semi-recessed fire extinguisher cabinets to comply with applicable codes.

2-2.4.1.4 Finishes:
Floor: porcelain tile, quarry tile, vinyl composition tile, or integrally stained concrete.
Base: porcelain tile, quarry tile, or resilient cove base.
Walls: impact resistant gypsum wallboard with vinyl wallcovering or painted finish.
Ceiling: suspended acoustical panel ceiling, painted gypsum wallboard, painted veneer plaster, painted Portland cement plaster, or painted underside of precast concrete structural floor planks.

2-2.4.1.5 Other requirements: Handicap accessible.

2-2.4.2 **Breezeway**. Refers to an unconditioned, covered corridor space that is enclosed on the long sides, but open to the exterior on the ends. Provide as required to allow circulation to building spaces and comply with applicable code egress requirements. Breezeways are an acceptable means of circulation between living units and other building spaces. [Edit as necessary to retain or delete use of breezeways. Breezeways are not recommended for very cold climates, nor where security and force protection are controlling issues.]

2-2.4.2.1 Function: Circulation and means of egress.

2-2.4.2.2 Adjacency requirements: Adjacent to vertical circulation.

2-2.4.2.3 Furnishings/Fixtures/Equipment (FFE): Provide mechanical and electrical systems to

comply with applicable codes. Provide fire extinguishers in semi-recessed fire extinguisher cabinets to comply with applicable codes. All fixtures and equipment shall be suitable for exterior locations.

2-2.4.2.4 Minimum Finishes:
Floor: sealed concrete
Base: Exterior wall material
Walls: Exterior wall material
Ceiling: painted exterior gypsum soffit board, painted Portland cement plaster, or painted underside of precast concrete structural floor planks.

2-2.4.2.5 Other requirements: Handicap accessible. With the exception of fire sprinkler systems, no piping, conduit or ductwork shall be exposed in breezeway. Provide slip resistant finish texture on concrete floor.

2-2.4.3 **Exterior Corridor.** Refers to an unconditioned, covered circulation space that is enclosed on one long side (adjacent to the building), and has a guardrail on the other side. Provide as required to allow circulation to building spaces and comply with applicable code egress requirements. When breezeways are used to provide access to living units, exterior corridors may be provided to link breezeways with stairs and other circulation components. Exterior corridors shall not be used to provide access to living units [HQ guidance disallows entering a living unit from an exterior corridor (although breezeways are acceptable). Edit as necessary to retain or delete use of exterior corridors. Exterior corridors are not recommended for very cold climates, nor where security and force protection are controlling issues. Metal guardrails can create an additional maintenance concern.]

2-2.4.3.1 Function: Circulation and means of egress.

2-2.4.3.2 Adjacency requirements: Adjacent to vertical circulation.

2-2.4.3.3 Furnishings/Fixtures/Equipment (FFE): Provide mechanical and electrical systems to comply with applicable codes. Provide fire extinguishers in semi-recessed fire extinguisher cabinets to comply with applicable codes. All fixtures and equipment shall be suitable for exterior locations.

2-2.4.3.4 Minimum Finishes:
Floor: sealed concrete
Base: Exterior wall material
Walls: Exterior wall material
Ceiling: painted exterior gypsum soffit board, painted Portland cement plaster, or painted underside of concrete structure above

2-2.4.3.5 Other requirements: Handicap accessible. With the exception of fire sprinkler systems, no piping, conduit or ductwork shall be exposed in exterior corridor. Provide slip resistant finish texture on concrete floor. Guardrails shall be painted hot dip galvanized steel, or prefinished aluminum rail system designed in accordance with applicable codes.

2-2.4.4 **Interior Stairs**. Provide as required to allow circulation to upper floors of the building, and to comply with applicable code egress requirements. Due to security, climate, and force protection concerns, interior stairs are preferred over exterior stairs.

2-2.4.4.1 Function: Circulation and means of egress.

2-2.4.4.2 Adjacency requirements: Adjacent to corridors or breezeways. Connects all floors of the building.

2-2.4.4.3 Furnishings/Fixtures/Equipment (FFE): Stairs shall be steel construction with concrete-filled treads, or cast-in-place concrete construction. Open risers are prohibited. Provide mechanical and electrical systems to comply with applicable codes.

2-2.4.4.4 Minimum Finishes:
Landing floor: porcelain tile, quarry tile, resilient tile, vinyl composition tile, or sealed concrete.
Base: porcelain tile, quarry tile, or resilient cove base.
Treads: porcelain tile, quarry tile, resilient treads, or sealed concrete. Provide slip-resistant nosing if tile is used.
Risers: painted steel, porcelain tile, quarry tile, or sealed concrete.
Walls: painted impact resistant gypsum wallboard, or painted concrete masonry units.
Ceiling: suspended acoustical panel ceiling, painted gypsum wallboard, painted veneer plaster, painted Portland cement plaster, or painted underside of precast concrete structural floor planks

2-2.4.4.5 Other requirements: Stairs shall comply with handicap accessibility requirements of applicable codes. Railings shall be painted galvanized steel, or prefinished aluminum.

2-2.4.5 **Exterior Stairs**. Provide as required to allow circulation to upper floors of the building, and to comply with applicable code egress requirements. Due to security, climate, and force protection concerns, interior stairs are preferred over exterior stairs. Exterior stairs shall be covered.

2-2.4.5.1 Function: Circulation and means of egress.

2-2.4.5.2 Adjacency requirements: Adjacent to corridors or breezeways. Connects all floors of the building.

2-2.4.5.3 Furnishings/Fixtures/Equipment (FFE): Exterior stairs shall be cast-in-place concrete construction (preferred), or galvanized steel construction with concrete-filled treads. Open risers and metal grating treads are prohibited.

2-2.4.5.4 Minimum Finishes:
Landing floor: sealed concrete with slip-resistant finish texture.
Base: none
Treads: Sealed concrete with slip-resistant finish texture. Provide slip-resistant nosing.
Risers: painted steel, or sealed concrete.
Walls: exterior wall materials
Ceiling: painted exterior gypsum soffit board, painted Portland cement plaster, or painted underside of concrete structure above

2-2.4.5.5 Other requirements: Stairs shall comply with handicap accessibility requirements of applicable codes. Railings shall be painted galvanized steel, or prefinished aluminum. Refer to Chapter 5 for hardware and security requirements for exterior doors.

2-2.4.6 **Mechanical Areas**. Provide dedicated interior spaces and exterior areas for plumbing, fire protection, and HVAC equipment. Size and locate rooms to allow equipment removal and maintenance Provide floor openings and vertical shaft spaces as necessary.

2-2.4.6.1 Function: Mechanical support spaces for the UEPH building.

2-2.4.6.2 Adjacency requirements: Locate main mechanical room on ground floor with doors opening to exterior. Mechanical support spaces shall not be used for storage or other purposes; access to mechanical spaces will be limited to authorized personnel. Locate exterior mechanical equipment and air intake and openings in exterior walls to comply with force protection standards. Do not locate mechanical equipment rooms adjacent to living units (shared walls).

2-2.4.6.3 Furnishings/Fixtures/Equipment: As required by Statement of Work.

2-2.4.6.4 Minimum Finishes:
Floor: sealed concrete
Base: resilient cove base, or none
Walls: painted gypsum wallboard or painted veneer plaster, or painted concrete masonry units
Ceiling: none required

2-2.4.6.5 Other requirements: Locate air intake and exhaust openings to provide optimum indoor air quality. Roof mounted equipment shall not be used. Provide screening around outdoor equipment areas (refer to Chapter 3); comply with force protection standards. Doors shall have storeroom function (F86) locksets.

2-2.4.7 **Electrical Rooms**. Provide dedicated interior spaces and exterior areas for electrical equipment. Size and locate rooms to allow equipment removal and maintenance. Provide floor openings and vertical shaft spaces as necessary. Provide minimum of one electrical room per floor.

2-2.4.7.1 Function: Electrical support spaces for the UEPH building.

2-2.4.7.2 Adjacency requirements: Locate main electrical equipment room on ground floor. Electrical rooms on upper floors should be located to allow efficient distribution. Size and locate rooms to allow equipment removal and maintenance. Electrical rooms shall not be used for storage or other purposes; access to electrical rooms will be limited to authorized personnel. Locate exterior electrical equipment to comply with force protection standards.

2-2.4.7.3 Furnishings/Fixtures/Equipment: As required by Statement of Work.

2-2.4.7.4 Minimum Finishes:
Floor: sealed concrete
Base: resilient cove base, or none.
Walls: painted gypsum wallboard or painted veneer plaster, or painted concrete masonry units
Ceiling: none required

2-2.4.7.5 Other requirements: Electrical service to the building shall be underground. Provide masonry screen walls with lockable metal access gates around outdoor equipment (refer to Chapter 3); it is preferable to locate transformer within the screened mechanical equipment area. Comply with force protection standards. Door shall have storeroom function (F86) lockset.

2-2.4.8 **Communication Rooms**. Provide dedicated interior rooms for communication equipment. Size and locate rooms to allow equipment removal and maintenance; room area shall be minimum of 1.1 % of the building area served, however, minimum dimensions for each communication room shall be 2100 mm x 3000 mm [7’-0” x 10’-0”]. Provide minimum of one

communication room per floor.

2-2.4.8.1 Function: Telephone and data network support spaces for the UEPH building.

2-2.4.8.2 Adjacency requirements: Locate to allow efficient distribution. Communication rooms on upper floors shall be vertically stacked above each other. Communication rooms shall not be used for storage or other purposes; access will be limited to authorized personnel.

2-2.4.8.3 Furnishings/Fixtures/Equipment: As required by Statement of Work.

2-2.4.8.4 Minimum Finishes:
Floor: vinyl composition tile
Base: resilient cove base, or none.
Walls: painted gypsum wallboard or painted veneer plaster, or painted concrete masonry units
Ceiling: painted gypsum wallboard, painted veneer plaster, or suspended acoustical panel ceiling, or painted underside of concrete structure above

2-2.4.8.5 Other requirements: Communication service to the building shall be underground. Provide minimum 900 mm [3'-0"] wide door with storeroom function (F86) lockset. Provide floor openings and vertical shaft spaces as necessary. Provide a minimum of three 100 mm [4"] diameter empty conduits between vertically stacked communication rooms.

2-2.4.9 **Boot Wash Areas**. Provide paved exterior boot wash area at each entrance to the UEPH building. Design area for use by one soldier at a time.

2-2.4.9.1 Function: Exterior area for washing footgear prior to entering building.

2-2.4.9.2 Adjacency requirements: Locate on ground floor, adjacent to each entrance to the UEPH building.

2-2.4.9.3 Furnishings/Fixtures/Equipment: Provide drainage assembly: Removable 900 mm x 900 mm aluminum or stainless steel grating, with non-slip surface, supported by concrete storm drainage inlet box. Filtered runoff shall be piped to storm drainage system. Provide freeze-proof wall hydrant with aerator nozzle mounted approximately 400 mm above grating, control valve mounted at 800 mm above pavement. Provide 3'-0" long metal grab bar above control valve, mounted at 1000 mm above pavement. Top of grating and concrete structure shall align with adjacent concrete sidewalk. Provide concrete sidewalk between boot wash area and entrance sidewalk.

2-2.4.9.4 Finishes: refer to exterior building material requirements.

2-2.4.9.5 Other requirements: Provide adequate drainage away from building.

2-2.4.10 **Outside Storage Building**. Provide one separate, enclosed, weatherproof storage building, minimum 6 m^2 [65 sf]. [<u>If consistent with requirements of IDG, prefabricated storage building may be used in lieu of site-constructed storage building. If this option is added, revise building material requirements below</u>.]

2-2.4.10.1 Function: Storage for the following items (not in contract): lawn mowers, landscape maintenance equipment, snow removal equipment, tools, and one flammable storage cabinet for storing maximum of one five-gallon safety can of gasoline, and twelve one-quart containers of motor

oil.

2-2.4.10.2 Adjacency requirements: Locate remote from UEPH and other occupied buildings. It is preferable to locate the storage building adjacent to the trash dumpster area. Comply with building code setback requirements. Provide minimum force protection setback of 24.4 meters [80 feet] to UEPH buildings and any other inhabited buildings.

2-2.4.10.3 Furnishings/Fixtures/Equipment: Provide one interior light fixture with safety cage, controlled by occupancy sensor switch. No electrical receptacles shall be provided.

2-2.4.10.4 Building materials: Floor: sealed concrete slab on grade.
Exterior wall material: Masonry to match materials used on masonry screen walls.
Structure: Non-combustible materials. Fire-retardant wood or plywood shall not be used.
Roofing: match roof of UEPH building.
Interior wall finish: painted impact resistant gypsum wallboard or painted concrete masonry units.

Ceiling: painted exposed structure.

2-2.4.10.5 Other requirements: Provide wall louvers to allow natural cross-ventilation. Roof penetrations are not acceptable. Provide hollow metal door and frame with storeroom function (F86) lockset. Comply with NFPA 30 requirements for storage of flammable materials. Provide minimum 1200 mm [4'-0"] wide sidewalk from entry door to adjacent pavement or sidewalk. Provide bracket-mounted fire extinguisher.

2-3 **COMPANY OPERATIONS FACILITIES FUNCTIONAL AND AREA REQUIREMENTS.** Company operations facilities (COF) shall consist of administrative and supply areas for each company, support spaces, and common locker/shower facilities. Provide facilities for [__] large companies, [__] medium companies, and [__] small companies. Net areas of administrative spaces are the same for each size company; net areas of supply spaces and locker/shower facilities vary with company size. Total gross area of each size COF shall not exceed the following: Large company 1095 m2 [11,777 sf]; medium company 915 m2 [9843 sf]; small company 750 m2 [8,056 sf]. Total gross building area of all COF buildings shall not exceed [____] m^2 [_____ sf] [Maximum gross area shall be as shown on form DD 1391]. Facilities may comprise a single building or multiple buildings. Buildings may be one or two stories in height. In a two-story configuration, supply and locker/shower areas shall be located on the first floor; administrative functions may be located on the second floor. An elevator is not required. Grouping multiple COF's in one building is encouraged, however, each company must function independently, and must be secured from other COFs. Provide separate exterior entrances to the administrative and supply areas of each COF. Common mechanical rooms may be used, but mechanical and electrical systems must provide each company with independent operation and control. Locker/shower spaces are to be provided for each company. These locker/shower spaces may be combined and shared by all companies in a building, or combined locker/shower spaces may be located in a separate building [determine User preference]. To the greatest extent possible, buildings shall be arranged to allow future reconfiguration of company sizes (for example, changes in mission may require the conversion of a building housing two large companies and one medium company into a building housing four small companies. In this example, an addition would be constructed to house the administrative functions of the fourth company, and supply areas originally designed for three companies could be reconfigured for four small companies). COF functions and areas shall be as follows:

2-3.1 **COF Administrative Areas**. Provide one group of administrative areas per company. Company leadership will manage the organization, receive visitors, and conduct day-to-day business from the COF administrative areas. Provide an easily identified, covered entrance. Entrance shall be separate and distinct from the entrances to company supply areas and to other COF administrative areas. Exterior wall space above or adjacent to the entrance will be used to display company identification signage. Provide interior circulation to company supply areas. Military personnel will staff the facility; military and non-military personnel will visit the administrative areas to meet with leadership or attend meetings in the conference room. Only able-bodied military personnel will be on staff, thus provisions for the disabled are not required. Provide the following areas for each company:

2-3.1.1 **Company Commander (CO)**. Provide one; 14 m^2 [150 sf]. Room shall be accessed through the Admin Office. Occupants: 1, and occasional visitors.

2-3.1.1.1 Function: Private office for commanding officer.

2-3.1.1.2 Adjacency requirements: Adjacent to Admin Office; near XO, 1st SGT, and Training Office.

2-3.1.1.3 Furnishings/Fixtures/Equipment: Provide and design room to accommodate one desk [____] with return [____], one bookcase [___], two legal-size four-drawer file cabinets, one conference table [___], four side chairs, and one desk chair.

2-3.1.1.4 Minimum Finishes:
Floor: vinyl composition tile
Base: resilient base
Walls: painted gypsum wallboard or painted veneer plaster
Ceiling: suspended acoustical panel ceiling

2-3.1.1.5 Other requirements: Provide 900 mm [3'-0"] wide door into room; door shall have entry function (F81) lockset. Room shall have exterior window. Partitions shall have minimum STC rating of 55.

2-3.1.2 **Executive Officer (XO)**. Provide one; 9.3 m^2 [100 sf]. Room shall be accessed through the Admin Office. Occupants: 1, and occasional visitors.

2-3.1.2.1 Function: Private office for the company executive officer.

2-3.1.2.2 Adjacency requirements: Adjacent to Admin Office; near CO, 1 SGT, and Training Office.

2-3.1.2.3 Furnishings/Fixtures/Equipment: Provide and design room to accommodate one desk [____] with return [____], one bookcase [___], two legal-size four-drawer file cabinets, one side chair and one desk chair. Provide a floor anchor for one GFGI security safe, approximate dimensions [_____], weight [___]. Coordinate anchor location with furniture layout; refer to paragraph 5-6.4.

2-3.1.2.4 Minimum Finishes:
Floor: vinyl composition tile
Base: resilient base
Walls: painted gypsum wallboard or painted veneer plaster

Ceiling: suspended acoustical panel ceiling

2-3.1.2.5 Other requirements: Provide 900 mm [3'-0"] wide door into room; door shall have entry function (F81) lockset. Room shall have exterior window. Partitions shall have minimum STC rating of 55.

2-3.1.3 **First Sergeant (1 SGT)**. Provide one; 11 m^2 [120 sf]. Room shall be accessed through the Admin Office. Occupants: 1, and occasional visitors.

2-3.1.3.1 Function: Private office for the company first sergeant (highest ranking non-commissioned officer).

2-3.1.3.2 Adjacency requirements: Adjacent to Admin Office; near CO, XO, and Training Office.

2-3.1.3.3 Furnishings/Fixtures/Equipment: Provide and design room to accommodate one desk [____] with return [____], one bookcase [___], two legal-size four-drawer file cabinets, four side chairs and one desk chair. Provide a floor anchor for one GFGI security safe, approximate dimensions [_____], weight [___]. Coordinate anchor location with furniture layout; refer to paragraph 5-6.4.

2-3.1.3.4 Minimum Finishes:
Floor: vinyl composition tile
Base: resilient base
Walls: painted gypsum wallboard or painted veneer plaster
Ceiling: suspended acoustical panel ceiling

Other requirements: Provide 900 mm [3'-0"] wide door into room; door shall have entry function (F81) lockset. Room shall have exterior window. Partitions shall have minimum STC rating of 55.

2-3.1.4 **Training Office**. Provide one; 9 m^2 [100 sf]. Room shall be accessed through the Admin Office. Occupants: 1, and occasional visitors.

2-3.1.4.1 Function: Private office for the company Training Officer.

2-3.1.4.2 Adjacency requirements: Adjacent to Admin Office; near CO, XO, and 1 SGT.

2-3.1.4.3 Furnishings/Fixtures/Equipment: Provide and design room to accommodate one desk [____] with return [____], one bookcase [___], two legal-size four-drawer file cabinets, two side chairs and one desk chair. Provide a floor anchor for one GFGI security safe, approximate dimensions [_____], weight [___]. Coordinate anchor location with furniture layout; refer to paragraph 5-6.4.

2-3.1.4.4 Minimum Finishes:
Floor: vinyl composition tile
Base: resilient base
Walls: painted gypsum wallboard or painted veneer plaster
Ceiling: suspended acoustical panel ceiling

2-3.1.4.5 Other requirements: Provide 900 mm [3'-0"] wide door into room; door shall have

entry function (F81) lockset. Exterior window is desirable. Partitions shall have minimum STC rating of 55.

2-3.1.5 **Admin Office**. Provide one area; minimum 30 m^2 [320 sf], including interior circulation. Room shall be accessed through the Waiting Area. Occupants: 2 clerks, and occasional visitors.

2-3.1.5.1 Function: Office for company administrative clerks, storage of files, access to private offices. Clerks will have visual control of waiting area and conference room door.

2-3.1.5.2 Adjacency requirements: Adjacent to Waiting Area; CO, XO, 1 SGT, and Training Office. Adjacent to or near Conference Room. Near main entrance to Administrative Area.

2-3.1.5.3 Furnishings/Fixtures/Equipment: Provide and design room to accommodate [_] clerk desks [____] with returns [____] and desk chairs, [insert info on other required furnishings]. Provide reception desk (built-in casework) minimum 1800 mm [6'-0"] long separating the Admin Office from the Waiting Area. The counter on the Waiting Area side shall be 1016 mm high x 300 mm deep [If user desires a method of securing Admin Office from Waiting Area, add requirement for overhead coiling grille or sliding pass-through window above counter]. Admin side of reception desk shall be at desk height, and shall accommodate computer and monitor (not in contract), and writing area. Provide built-in communication and power receptacles or grommets in desk top to access wall receptacles. Desk shall have knee space and minimum two cabinets with hinged doors, and two drawers. Drawers and cabinets shall have keyed locks. Desk components shall have plastic laminate or stained wood finish. Provide a floor anchor for one GFGI security safe, approximate dimensions [_____], weight [___]. Coordinate anchor location with furniture layout; refer to paragraph 5-6.4.

2-3.1.5.4 Minimum Finishes:
Floor: carpet or vinyl composition tile
Base: resilient base
Walls: painted gypsum wallboard or painted veneer plaster
Ceiling: suspended acoustical panel ceiling

2-3.1.5.5 Other requirements: Provide 900 mm [3'-0"] wide entry door into room from Waiting Area; door shall have entry function (F81) lockset. Exterior window is desirable.

2-3.1.6 **Admin Storage**. Provide one; minimum area 3 m^2 [35 sf]. Room shall be accessed from the Admin Office.

2-3.1.6.1 Function: Closet for storage of supplies, paper, etc.

2-3.1.6.2 Adjacency requirements: Adjacent to Admin Office.

2-3.1.6.3 Furnishings/Fixtures/Equipment:

2-3.1.6.4 Minimum Finishes:
Floor: vinyl composition tile
Base: resilient base
Walls: painted gypsum wallboard or painted veneer plaster
Ceiling: suspended acoustical panel ceiling, painted gypsum wallboard, or painted veneer plaster.

2-3.1.6.5 Other requirements: Door(s) shall have classroom function (F84) lockset.

2-3.1.7 **Administrative Area Corridor**. Provide as required to allow circulation to building spaces, and comply with applicable code egress requirements. Unless otherwise required, minimum corridor width shall be 1800 mm [6'-0"]. Administrative area corridor shall be capable of being secured from exterior entrances and from any adjacent public, unsecure corridors.

2-3.1.7.1 Function: Circulation and means of egress.

2-3.1.7.2 Adjacency requirements: Adjacent to entry vestibule, and vertical circulation (where occurs). Corridor(s) shall provide access to administrative area spaces and shall provide circulation between administrative spaces and supply spaces. Corridor may directly link a company's administrative area to its supply area; or the company's administrative area corridor may provide access to a public, unsecure corridor that provides access to the supply areas of all companies in the building.

2-3.1.7.3 Furnishings/Fixtures/Equipment (FFE): Provide one handicap accessible electric water cooler. Provide fire extinguishers in semi-recessed fire extinguisher cabinets to comply with applicable codes.

2-3.1.7.4 Minimum Finishes:
Floor: porcelain tile, quarry tile, or vinyl composition tile.
Base: porcelain tile, quarry tile, or resilient cove base.
Walls: impact resistant gypsum wallboard with painted finish.
Ceiling: suspended acoustical panel ceiling, painted gypsum wallboard, painted veneer plaster, or painted Portland cement plaster.

2-3.1.7.5 Other requirements: [Add security and locking requirements for corridor doors].

2-3.1.8 **Waiting Area**. Provide one area, approximately 10 m2 [110 sf] incorporated into the Administrative Area Corridor. Occupants: Two or more visitors; additional visitors (e.g. those waiting to attend a large meeting in the conference room) will wait in the adjacent corridor.

2-3.1.8.1 Function: Waiting and reception area for company soldiers and visitors. Control point for access to admin office and conference room.

2-3.1.8.2 Adjacency requirements: Adjacent to, or very close to, entry vestibule; reception desk should be easily seen by visitors entering the building. Waiting Area is open to Administrative Area Corridor.

2-3.1.8.3 Furnishings/Fixtures/Equipment (FFE): Provide two side chairs [verify seating requirement with user]. Provide one 1200 mm high x 1800 mm wide [4'-0" x 6'-0"] wall mounted bulletin board.

2-3.1.8.4 Minimum Finishes: Match Administrative Area Corridor.

2-3.1.8.5 Other requirements:

2-3.1.9 **Entry Vestibule**. Provide at main exterior entrance to Administrative Area Corridor. [If climate dictates, revise this sentence to require vestibules at all entrances to the building.]

2-3.1.9.1 Function: Primary entry point into the COF; weather protection for interior spaces.

2-3.1.9.2 Adjacency requirements: Adjacent to Administrative Area Corridor.

2-3.1.9.3 Furnishings/Fixtures/Equipment:

2-3.1.9.4 Minimum Finishes:
Floor: porcelain tile, quarry tile, or vinyl composition tile.
Base: porcelain tile or quarry tile
Walls: Match exterior wall finish material (preferred), or painted impact resistant gypsum wallboard, or painted veneer plaster
Ceiling: painted gypsum wallboard, painted veneer plaster, or painted Portland cement plaster.

2-3.1.9.5 Other requirements: Provide aluminum storefront entrance doors on exterior and corridor sides of vestibule. Additional aluminum storefront area (sidelights, transoms) is desirable. Provide minimum 1800 mm [6'-0"] deep exterior covered area (entry porch) full width of storefront. Provide location for company identification signage on exterior wall above or adjacent to entrance.

2-3.1.10 **Platoon Office**. Provide four; each 11 m^2 [120 sf]. Offices shall be accessed directly from the Administrative Area Corridor, or through a common space that is accessed from the Administrative Area Corridor. Occupants: 2 in each office, and occasional visitors.

2-3.1.10.1 Function: Private office for platoon leaders or other administrators.

2-3.1.10.2 Adjacency requirements: Adjacent to Administrative Area Corridor. Near Admin Office.

2-3.1.10.3 Furnishings/Fixtures/Equipment: Provide and design each office to accommodate one desk [____] with return [____], one side chair and one desk chair [Coordinate additional furniture requirements with user].

2-3.1.10.4 Minimum Finishes:
Floor: vinyl composition tile
Base: resilient cove base
Walls: painted gypsum wallboard or painted veneer plaster
Ceiling: suspended acoustical panel ceiling

2-3.1.10.5 Other requirements: Exterior window is desirable but not required. Partitions shall have minimum STC rating of 49.

2-3.1.11 **Conference Room**. Provide one; 34 m^2 [360 sf]. Room shall be accessed from the Waiting Area (preferable), or through the Admin Office. Admin clerks shall have visual control of Conference Room door. Occupants: up to 22 persons.

2-3.1.11.1 Function: Conference room for company leadership, staff, and visitors. Functions will include staff meetings, hearings, disciplinary sessions, training.

2-3.1.11.2 Adjacency requirements: Adjacent to Admin Office or Waiting Area.

2-3.1.11.3 Furnishings/Fixtures/Equipment: Provide and design room to accommodate

[Coordinate furniture requirements with user]. Provide one marker board (minimum 2400 mm wide x 1200 mm high [8'-0" x 4'-0"]) and one 2400 mm wide [8'-0"] wall mounted pull-down projection screen.

2-3.1.11.4 Minimum Finishes:
Floor: vinyl composition tile
Base: resilient base
Walls: painted gypsum wallboard or painted veneer plaster
Ceiling: suspended acoustical panel ceiling

2-3.1.11.5 Other requirements: Door shall have classroom function (F84) lockset. Partitions shall have minimum STC rating of 55.

2-3.1.12 **Conference Room Storage**. Provide one; minimum area 2 m^2 [22 sf]. Room shall be accessed from the Conference Room.

2-3.1.12.1 Function: Closet for storage of folding tables, display easels, etc.

2-3.1.12.2 Adjacency requirements: Adjacent to Conference Room.

2-3.1.12.3 Furnishings/Fixtures/Equipment:

2-3.1.12.4 Minimum Finishes:
Floor: vinyl composition tile
Base: resilient base
Walls: painted gypsum wallboard or painted veneer plaster
Ceiling: suspended acoustical panel ceiling, painted gypsum wallboard, or painted veneer plaster

2-3.1.12.5 Other requirements: Door(s) shall have classroom function (F84) lockset.

2-3.1.13 **Men's Toilet**. Provide one private toilet room. Room shall be sized to comply with handicap accessibility requirements. Room shall be accessed from Administrative Area Corridor.

2-3.1.13.1 Function: Men's single-occupant toilet and lavatory, for use by staff and visitors.

2-3.1.13.2 Adjacency requirements: Adjacent to Administrative Area Corridor. Near Shower rooms and Women's Toilet.

2-3.1.13.3 Furnishings/Fixtures/Equipment (FFE): Provide one floor mounted toilet, one wall-hung lavatory, mirror with shelf above lavatory, Paper towel dispenser/waste receptacle, soap dispenser, toilet tissue dispenser, and wall mounted grab bars at toilet.

2-3.1.13.4 Minimum Finishes:
Floor: porcelain tile, or ceramic tile.
Base: porcelain tile, or ceramic tile.
Walls: ceramic tile
Ceiling: painted gypsum wallboard, painted veneer plaster, or painted Portland cement plaster.

2-3.1.13.5 Other requirements: Door shall have privacy function (F76) lockset. Partitions shall have minimum STC rating of 49.

2-3.1.14 **Women's Toilet**. Provide one private toilet room. Room shall be sized to comply with handicap accessibility requirements. Room shall be accessed from Administrative Area Corridor.

2-3.1.14.1 Function: Women's single-occupant toilet and lavatory, for use by staff and visitors.

2-3.1.14.2 Adjacency requirements: Adjacent to Administrative Area Corridor. Near Shower rooms and Men's Toilet.

2-3.1.14.3 Furnishings/Fixtures/Equipment (FFE): Provide one floor mounted toilet, one wall-hung lavatory, mirror with shelf above lavatory, Paper towel dispenser/waste receptacle, soap dispenser, sanitary napkin disposal, toilet tissue dispenser, and wall mounted grab bars at toilet.

2-3.1.14.4 Minimum Finishes:
Floor: porcelain tile, or ceramic tile.
Base: porcelain tile, or ceramic tile.
Walls: ceramic tile
Ceiling: painted gypsum wallboard, painted veneer plaster, or painted Portland cement plaster.

2-3.1.14.5 Other requirements: Door shall have privacy function (F76) lockset. Partitions shall have minimum STC rating of 49.

2-3.1.15 **Shower Rooms**. [(Optional) verify User preference] Provide two. Rooms shall be used by able-bodied military personnel only. Rooms shall be accessed from Administrative Area Corridor. Shower room shall not be combined with toilet rooms.

2-3.1.15.1 Function: Private shower and dressing room for use by company leadership after physical training.

2-3.1.15.2 Adjacency requirements: Adjacent to Administrative Area Corridor. Near toilets.

2-3.1.15.3 Furnishings/Fixtures/Equipment (FFE): Provide one ceramic tile shower with rod and shower curtain. Shower shall have ceramic soap holder and wall mounted grab bar. Dressing area shall have bench, four towel/robe hooks, and wall mounted full-length mirror. Provide floor drain at dressing area, locate outside of circulation path.

2-3.1.15.4 Minimum Finishes:
Floor: ceramic tile.
Base: ceramic tile.
Walls: ceramic tile
Ceiling: painted Portland cement plaster.

2-3.1.15.5 Other requirements: Door shall have privacy function (F76) lockset.

2-3.1.16 **Janitor Closet**. Provide one. Minimum area 2 m^2 [22 sf]. Room shall be accessed from Administrative Area Corridor.

2-3.1.16.1 Function: Sink and storage of cleaning supplies, soap, and paper products.

2-3.1.16.2 Adjacency requirements: Adjacent to Administrative Area Corridor. Near Shower

rooms and toilets.

2-3.1.16.3 Furnishings/Fixtures/Equipment (FFE): Provide one floor mounted mop sink, mop rack for three mops, and minimum 1500 linear mm of wall mounted stainless steel shelving.

2-3.1.16.4 Minimum Finishes:
Floor: ceramic tile, or sealed concrete
Base: ceramic tile base or resilient cove base
Walls: painted water-resistant gypsum wallboard, or painted concrete masonry units
Ceiling: painted gypsum wallboard, painted veneer plaster, or painted Portland cement plaster

2-3.1.16.5 Other requirements: Door shall have classroom function (F84) lockset.

2-3.1.17 **Communication Room**. Provide dedicated interior room(s) for communication distribution equipment. Room(s) shall be dedicated to one company, and shall not be combined with mechanical or electrical rooms. Room(s) may be accessed from Administrative Area Corridor, public unsecure corridor (if provided), or Equipment Maintenance Area. Access will be limited to authorized personnel. Provide each company with one main communication room; minimum size 2100 mm [7'-0"] x 3000 mm [10'-0"]. In two-story buildings, the communication room shall be located on the second floor. Provide additional communication rooms as needed; all spaces having telephone or computer data outlets shall be located to allow a maximum cable length of 90 m [295 feet] between outlet and communication room. Minimum dimensions of secondary communication rooms shall be 2100 mm [7;-0"] x 3000 mm [10'-0"]. Provide floor openings and vertical shaft spaces as necessary.

2-3.1.17.1 Function: Telephone and data network support spaces for the COF.

2-3.1.17.2 Adjacency requirements: Locate to allow efficient distribution. Communication rooms shall not be used for storage or other purposes; access will be limited to authorized personnel.

2-3.1.17.3 Furnishings/Fixtures/Equipment: As required by Statement of Work.

2-3.1.17.4 Finishes: Floor: vinyl composition tile
Base: resilient cove base
Walls: painted gypsum wallboard or painted veneer plaster, or painted concrete masonry units
Ceiling: painted gypsum wallboard, painted veneer plaster, or suspended acoustical panel ceiling

2-3.1.17.5 Other requirements: Door shall have minimum 900 mm [3'-0"] wide door with storeroom function (F86) lockset.

2-3.2 **COF Supply Areas**. Provide one group of supply areas per company; locate on the ground floor. COF supply areas will be used to store, clean, and repair company operational equipment and weapons. Individual TA-50 gear lockers shall be provided for approximately [TBD] percent of the company soldiers. Main entrance to supply areas will be from paved service area; service area will be used for loading company equipment on and off of military vehicles including large trucks. Entrance shall be separate and distinct from the entrances to company administrative areas and to other COF supply areas. Exterior wall space above or adjacent to the entrance will be used to display company identification signage. Provide interior circulation to company administrative areas. Only able-bodied military personnel will occupy COF supply areas; handicapped accessibility is not required. Wire mesh partitions shall be used to separate storage areas from each other and from Equipment Maintenance Area.

Provide the following areas for each company:

2-3.2.1 **Equipment Maintenance Area**. Provide one area. Minimum area: Large company 123 m^2 [1,325 sf]; Medium company 103 m^2 [1,105 sf]; Small company 55 m^2 [590 sf]. Main exterior entry shall open to paved service yard. Provide interior access from COF administrative area via administrative area corridor, stairs, or public unsecure corridor connecting other COFs in the building.

2-3.2.1.1 Function: Equipment cleaning, repair and access to COF storage spaces.

2-3.2.1.2 Adjacency requirements: Adjacent to exterior paved area for loading equipment on large vehicles. Adjacent to Arms Vault, TA-50 Lockers, and storage spaces. Adjacent to, or near Administrative Area.

2-3.2.1.3 Furnishings/Fixtures/Equipment: Provide stainless steel equipment cleaning sinks 600 mm x 600 mm x 350 mm deep [24" x 24" x 14"], (three sinks for large and medium companies, two sinks for small companies), locate near exterior doors. Provide fire extinguishers in semi-recessed fire extinguisher cabinets to comply with applicable codes. [Add requirements for shelving].

2-3.2.1.4 Minimum Finishes:
Floor: sealed concrete
Base: none
Walls: painted impact resistant gypsum wallboard or painted concrete masonry units at exterior walls and walls separating COFs. Painted concrete walls will separate Arms Storage from Equipment Maintenance. Wire mesh partitions will separate storage areas from Equipment Maintenance.
Ceiling: painted exposed structure.

2-3.2.1.5 Other requirements: Provide an uncovered mud removal area for equipment cleaning outside of the building at the paved service yard, near the Equipment Maintenance Area. This area will consist of freeze-proof hose bibbs mounted [___mm above] a concrete slab with a removable non-slip grate cover. The slab should be designed to allow water to drain to the storm drainage system, and allow easy collection and disposal of mud removed during the cleaning process. Provide the following number of hose bibbs: 16 for large company; 10 for medium company; 6 for small company. Provide a pair of 900 mm wide hollow metal doors opening onto the paved service yard; doors shall have hold open devices. All entry doors into Equipment Maintenance Area shall have entry function (F82) locksets with auxiliary deadlocks (thumb turn inside, keyed cylinder outside), or function F08 exit devices (if exit devices are required by code).

2-3.2.2 **Arms Vault**. Provide one. Area: Large company 44 m^2 [475 sf] [edit if large company requires larger vault]; Medium company 33 m^2 [355 sf]; Small company 33 m^2 [355 sf]. Construction of Arms Vault shall comply with paragraph 5-6.2. Room shall be accessed from Equipment Maintenance area. Occupants:[insert number]. [The 33 m^2 arms vault programmed for the small and medium COF may be increased by the installation to 44 m^2 without prior approval, but the overall gross area of the COF may not be increased unless approved by DA.]

2-3.2.2.1 Function: Storage and issue of weapons. [**Important !** Verify the contents of each Arms Vault with users. This model SOW is written based on the assumption that ammunition **will not** be stored in the vaults. **If ammunition or other explosives are to be stored, stringent High-Hazard occupancy Group H-1 requirements of the International Building Code will apply. Coordinate**

with the authority having jurisdiction prior to issuance of the RFP.].

2-3.2.2.2 Adjacency requirements: Adjacent to Equipment Maintenance Area

2-3.2.2.3 Furnishings/Fixtures/Equipment: Provide arms rack anchor rings on all walls inside Arms Vault; refer to paragraph 5-6.2.5. Arms racks are not in contract.

2-3.2.2.4 Minimum Finishes:
Floor: sealed concrete
Base: none.
Walls: painted concrete
Ceiling: painted concrete.

2-3.2.2.5 Other requirements: Provide day gate in addition to vault door. [Add requirement for dehumidifier if necessary]

2-3.2.3 **Unit Storage**. Provide one area. Minimum area: Large company 85 m^2 [915 sf]; Medium company 58 m^2 [625 sf]; Small company 25.1 m^2 [270 sf]. Exterior entry shall open to paved service yard. Provide access from Equipment Maintenance Area and from exterior service yard.

2-3.2.3.1 Function: Storage of [insert contents of room]

2-3.2.3.2 Adjacency requirements: Adjacent to exterior paved area for loading equipment on large vehicles. Adjacent to Equipment Maintenance Area.

2-3.2.3.3 Furnishings/Fixtures/Equipment: [add requirements for shelving].

2-3.2.3.4 Minimum Finishes:
Floor: sealed concrete
Base: none
Walls: Wire mesh partitions will separate Unit Storage area from Equipment Maintenance and adjacent storage areas within the COF. Provide painted impact resistant gypsum wallboard, or painted concrete masonry units at exterior walls and walls separating Unit Storage from adjacent COFs.
Ceiling: painted exposed structure, or wire mesh.

2-3.2.3.5 Other requirements: Provide a pair of 900 mm wide hollow metal doors opening onto the paved service yard; doors shall have hold open devices and entry function (F82) locksets with auxiliary deadlocks (thumb turn inside, keyed cylinder outside), or function F08 exit devices (if exit devices are required by code). Provide 900 mm [3'-0"] wide swinging door with keyed cylinder lock in wire mesh partition at Equipment Storage. Provide wire mesh ceiling or extend wire mesh partitions to underside of structure above.

2-3.2.4 **General Storage**. Provide one area. Minimum area: Large company 33 m^2 [355 sf]; Medium company 26 m^2 [280 sf]; Small company 15 m^2 [160 sf]. Provide access from Equipment Maintenance Area.

2-3.2.4.1 Function: Storage of soldier's personal or other miscellaneous items during times of Deployment, AWOL situations, etc.

2-3.2.4.2 Adjacency requirements: Adjacent to Equipment Maintenance Area.

2-3.2.4.3 Furnishings/Fixtures/Equipment: [add requirements for shelving].

2-3.2.4.4 Minimum Finishes:
Floor: sealed concrete
Base: none
Walls: Wire mesh partitions will separate General Storage area from Equipment Maintenance and adjacent storage areas within the COF. Provide painted impact resistant gypsum wallboard, or painted concrete masonry units at exterior walls and walls separating General Storage from adjacent COFs.
Ceiling: painted exposed structure, or wire mesh.

2-3.2.4.5 Other requirements: Provide 900 mm [3'-0"] wide swinging door with keyed cylinder lock in wire mesh partition at Equipment Storage. Provide wire mesh ceiling or extend wire mesh partitions to underside of structure above.

2-3.2.5 **Nuclear, Biological and Chemical Equipment (NBC) Storage**. Provide one area. Minimum area: Large company 16 m^2 [170 sf]; Medium company 13 m^2 [140 sf]; Small company 11 m^2 [120 sf]. Provide access from Equipment Maintenance Area.

2-3.2.5.1 Function: Storage of equipment for use in defense of nuclear, biological or chemical warfare.

2-3.2.5.2 Adjacency requirements: Adjacent to Equipment Maintenance Area.

2-3.2.5.3 Furnishings/Fixtures/Equipment: [add requirements for shelving].

2-3.2.5.4 Minimum Finishes:
Floor: sealed concrete
Base: none
Walls: Wire mesh partitions will separate NBC Storage area from Equipment Maintenance and adjacent storage areas within the COF. Provide painted impact resistant gypsum wallboard, or painted concrete masonry units at exterior walls and walls separating NBC Storage from adjacent COFs.
Ceiling: painted exposed structure, or wire mesh.

2-3.2.5.5 Other requirements: Provide 900 mm [3'-0"] wide swinging door with keyed cylinder lock in wire mesh partition at Equipment Storage. Provide wire mesh ceiling or extend wire mesh partitions to underside of structure above.

2-3.2.6 **Communications Storage**. Provide one area. Minimum area: Large company 16 m^2 [170 sf]; Medium company 14 m^2 [150 sf]; Small company 11 m^2 [120 sf]. Provide access from Equipment Maintenance Area.

2-3.2.6.1 Function: Storage of radios and communications field gear.

2-3.2.6.2 Adjacency requirements: Adjacent to Equipment Maintenance Area.

2-3.2.6.3 Furnishings/Fixtures/Equipment: [add requirements for shelving].

2-3.2.6.4 Minimum Finishes:

Floor: sealed concrete
Base: none
Walls: Wire mesh partitions will separate Communications Storage area from Equipment Maintenance and adjacent storage areas within the COF. Provide painted impact resistant gypsum wallboard, or painted concrete masonry units at exterior walls and walls separating Communications Storage from adjacent COFs.
Ceiling: painted exposed structure, or wire mesh.

2-3.2.6.5 Other requirements: Provide 900 mm [3'-0"] wide swinging door with keyed cylinder lock in wire mesh partition at Equipment Storage. Provide wire mesh ceiling or extend wire mesh partitions to underside of structure above.

2-3.2.7 **TA-50 Storage**. Provide one area. Size and configure area to accommodate the following quantity of TA-50 lockers per company (allow minimum 2400 mm [8'-0"] clearance between parallel rows of lockers; minimum 900 mm [3'-0"] between open locker doors and obstructions): Large company [TBD] lockers (approximately [TBD]); Medium company [TBD] lockers (approximately [TBD]; Small company [TBD] lockers (approximately [TBD]). Provide access from Equipment Maintenance Area. Provide additional exit as required by applicable codes.

2-3.2.7.1 Function: Gear lockers for storage of individual soldier's TA-50 field gear.

2-3.2.7.2 Adjacency requirements: Adjacent to Equipment Maintenance Area.

2-3.2.7.3 Furnishings/Fixtures/Equipment: Provide TA-50 gear lockers; refer to paragraph _____, lockers should be a minimum of 600 mm (w) x 600 mm (d) x 1800 mm (h) (2'x2'x6').

2-3.2.7.4 Minimum Finishes:
Floor: sealed concrete
Base: none
Walls: Wire mesh partitions will separate TA-50 Storage area from Equipment Maintenance and adjacent storage areas within the COF. Provide painted impact resistant gypsum wallboard, or painted concrete masonry units at exterior walls and walls separating TA-50 Storage from adjacent COFs.
Ceiling: painted exposed structure, or wire mesh.

2-3.2.7.5 Other requirements: Provide 900 mm [3'-0"] wide swinging door with keyed cylinder lock in wire mesh partition at TA-50 Storage. Provide wire mesh ceiling or extend wire mesh partitions to underside of structure above.

2-3.3 **COF Support Areas**. Provide the following areas in each COF building. Stairs shall be provide in two-story structures. Only able-bodied personnel will occupy COF support areas; handicapped accessibility is not required.

2-3.3.1 **Mechanical Room(s)**. Provide dedicated areas for mechanical equipment. Each company shall have independent operation and control of HVAC system for its own spaces, but mechanical equipment may serve more than one company, and mechanical rooms may be combined. Mechanical rooms shall not be used for storage or other purposes. Access will be limited to authorized personnel. Size and locate room(s) to allow equipment removal and maintenance. Also, in humid climates, the option exists to condition all inhabited portions of the COF including the supply and shower/locker areas. The mechanical room shall be sized

accordingly to accommodate the increased mechanical equipment requirements. Provide floor openings and vertical shaft spaces as necessary.

2-3.3.1.1 Function: Spaces for HVAC, water heating, and other plumbing and mechanical equipment.

2-3.3.1.2 Adjacency requirements: Locate to allow efficient distribution. Mechanical rooms located on the ground floor shall have doors opening to the exterior. Mechanical rooms on second floor shall be accessed from corridors.

2-3.3.1.3 Furnishings/Fixtures/Equipment: As required by Statement of Work.

2-3.3.1.4 Minimum Finishes:
Floor: sealed concrete
Base: none.
Walls: painted gypsum wallboard or painted veneer plaster, or painted concrete masonry units
Ceiling: none required

2-3.3.1.5 Other requirements: Doors shall have storeroom function (F86) locksets.

2-3.3.2 **Electrical Room(s)**. Provide dedicated areas for electrical equipment. Each company shall have independent metering and control of the electrical system for its own spaces, but electrical equipment may serve more than one company, and electrical rooms may be combined. Electrical rooms shall not be used for storage or other purposes. Access will be limited to authorized personnel. Size and locate room(s) to allow equipment removal and maintenance. Provide floor openings and vertical shaft spaces as necessary.

2-3.3.2.1 Function: Spaces for electrical equipment.

2-3.3.2.2 Adjacency requirements: Locate to allow efficient distribution. Electrical rooms shall be accessed from the exterior or from corridors.

2-3.3.2.3 Furnishings/Fixtures/Equipment: As required by Statement of Work.

2-3.3.2.4 Minimum Finishes:
Floor: sealed concrete
Base: none
Walls: painted gypsum wallboard or painted veneer plaster, or painted concrete masonry units
Ceiling: none required

2-3.3.2.5 Other requirements: Electrical service to buildings shall be underground. Doors shall have storeroom function (F86) locksets.

2-3.3.3 **Interior Stairs**. Provide as required to allow circulation to upper floor of the building, and to comply with applicable code egress requirements. At least one stair connecting second and first floors shall be an interior stair. [Revise if exterior stairs are not acceptable due to regional climate.]

2-3.3.3.1 Function: Circulation and means of egress.

2-3.3.3.2 Adjacency requirements: Adjacent to corridors or breezeways. Connects all floors of

the building.

2-3.3.3.3 Furnishings/Fixtures/Equipment (FFE): Stairs shall be steel construction with concrete-filled treads, or cast-in-place concrete construction. Open risers are prohibited. Provide mechanical and electrical systems to comply with applicable codes.

2-3.3.3.4 Minimum Finishes:
Landing floor: porcelain tile, quarry tile, resilient tile, vinyl composition tile, or sealed concrete.
Base: porcelain tile, quarry tile, or resilient cove base.
Treads: porcelain tile, quarry tile, resilient treads, or sealed concrete. Provide slip-resistant nosing if tile is used.
Risers: painted steel, porcelain tile, quarry tile, or sealed concrete.
Walls: painted impact resistant gypsum wallboard, or painted concrete masonry units.
Ceiling: suspended acoustical panel ceiling, painted gypsum wallboard, painted veneer plaster, or painted Portland cement plaster.

2-3.3.3.5 Other requirements: Stairs shall comply with handicap accessibility requirements of applicable codes. Railings shall be painted steel, or prefinished aluminum.

2-3.3.4 **Exterior Stairs**. Provide as required to allow circulation to upper floor of the building. Comply with applicable code egress requirements. Exterior stairs shall be covered. [Delete this paragraph if regional climate precludes the use of exterior stairs.]

2-3.3.4.1 Function: Circulation and means of egress.

2-3.3.4.2 Adjacency requirements: Adjacent to corridors or breezeways. Connects all floors of the building.

2-3.3.4.3 Furnishings/Fixtures/Equipment (FFE): Exterior stairs shall be cast-in-place concrete construction (preferred), or galvanized steel construction with concrete-filled treads. Open risers and metal grating treads are prohibited.

2-3.3.4.4 Minimum Finishes:
Landing floor: sealed concrete with slip-resistant finish texture.
Base: none required
Treads: Sealed concrete with slip-resistant finish texture
Risers: painted steel, or sealed concrete
Walls: exterior wall materials
Ceiling: painted exterior gypsum soffit board, painted Portland cement plaster, or painted underside of concrete structure above

2-3.3.4.5 Other requirements: Stairs shall comply with handicap accessibility requirements of applicable codes. Railings shall be painted galvanized steel, or prefinished aluminum.

2-3.4 **Common Locker/Shower Areas**. Provide one group of men's and one group of women's common locker/shower areas per COF, or provide one or more separate locker/shower for the entire project. Locate on ground floor. Quantities of lockers and plumbing fixtures for men and women vary by company size. Provide the quantity of lockers and fixtures indicated in the table below. Soldiers will use locker rooms before and after physical training. Handicapped accessibility is not required. Provide exterior entrance(s) with adjacent boot wash area. Additional entrances may be provided from a common public corridor in the COF.

Entrances shall be separate and distinct from the entrances to company supply and administrative areas. Exterior entrance vestibules shall be provided. Entrances shall provide visual privacy into the spaces. If locker rooms are provided as a separate building, a covered exterior walkway to the COF building is desirable, but not required. If separate buildings are provided for Locker/Shower Areas, provide additional mechanical rooms, electrical rooms, and other support spaces needed for a complete facility.

Table 2.1 Locker Room Plumbing Fixture and Locker Quantities

	LARGE COMPANY		MEDIUM COMPANY		SMALL COMPANY	
	MEN	**WOMEN**	**MEN**	**WOMEN**	**MEN**	**WOMEN**
Lockers	32	8	20	4	12	4
Toilets *	2	2	2	1	1	1
Urinals *	2	-	1	-	1	-
Lavatories *	4	2	2	1	1	1
Showers *	8	2	5	1	3	1

* **NOTE 1:** When 3 or more company locker room facilities are grouped together, plumbing fixture quantities may be reduced to 85 percent of the number required by the table (round to next lowest whole number). Example: If men from one large and two medium companies will share one locker room, the men's shower requirement will be: (8 + 5 + 5) x .85 = 15.3 = 15 showers.

** **NOTE 2:** Ratio of showers and toilets for men and women can be adjusted to suit specific unit requirements, but total fixture count shall not be exceeded. Layout should provide flexibility to adjust for future ratio revisions with minimum construction efforts.

2-3.4.1 **Women's Locker Room**. Provide one or more rooms, sized to accommodate the number of lockers and plumbing fixtures required for each company served. Provide exterior entrance(s) with airlock vestibule. Locker room may also be accessed from a common interior public corridor in the COF building. For egress purposes, the occupant load shall be equal to the higher of the following numbers: a) the number of lockers in the room, or b) the code determined number of occupants calculated by multiplying room area x the occupant load factor.

2-3.4.1.1 Function: Toilets, showers and lockers for female soldiers.

2-3.4.1.2 Adjacency requirements: Near Men's Locker Room. Near company operations facilities.

2-3.4.1.3 Furnishings/Fixtures/Equipment (FFE): Provide floor mounted toilets, wall-hung lavatories, and ceramic tile shower enclosures in the quantities indicated in the table above. Provide toilet partitions at each toilet; provide dressing compartment partitions at each shower. Provide the following toilet accessories: one mirror with shelf above each lavatory; one paper towel dispenser/waste receptacle per two lavatories (or fraction thereof); one soap dispenser per lavatory; one sanitary napkin disposal per toilet; one toilet tissue dispenser per toilet; one soap holder per shower; one shower curtain and rod at each shower and at each dressing compartment; two double pin robe hooks at each dressing compartment; one robe hook on each toilet partition door; one sanitary napkin and tampon vending machine. Provide one dressing compartment bench in each dressing compartment; provide a minimum of 300 mm [1'-0"] of locker room bench per 2 lockers provided. Provide a wall mounted, hand held, electric hair dryer per each lavatory; mount adjacent to mirrors. Provide fire extinguishers in semi-

recessed fire extinguisher cabinets to comply with applicable codes

2-3.4.1.4 Minimum Finishes:
Floor: porcelain tile, or ceramic tile.
Base: porcelain tile, or ceramic tile.
Walls: ceramic tile, or 1800 mm high ceramic tile wainscot with painted impact resistant gypsum wallboard or painted concrete masonry units above.
Ceiling: painted Portland cement plaster, or suspended cement board with synthetic finish system.

2-3.4.1.5 Other requirements:

2-3.4.2 **Men's Locker Room**. Provide one or more rooms, sized to accommodate the number of lockers and plumbing fixtures required for each company served. Provide exterior entrance(s) with airlock vestibule. Locker room may also be accessed from a common interior public corridor in the COF building. For egress purposes, the occupant load shall be equal to the higher of the following numbers: a) the number of lockers in the room, or b) the code determined number of occupants calculated by multiplying room area x the occupant load factor.

2-3.4.2.1 Function: Toilets, showers and lockers for male soldiers.

2-3.4.2.2 Adjacency requirements: Near Women's Locker Room. Near company operations facilities.

2-3.4.2.3 Furnishings/Fixtures/Equipment (FFE): Provide floor mounted toilets, wall-hung lavatories, and ceramic tile shower enclosures in the quantities indicated in the table above. Provide toilet partitions at each toilet. Provide the following toilet accessories: one mirror with shelf above each lavatory; one paper towel dispenser/waste receptacle per two lavatories (or fraction thereof); one soap dispenser per lavatory; one toilet tissue dispenser per toilet; one soap holder per shower; one shower curtain and rod at each shower; one double pin robe hook outside each shower; one robe hook on each toilet partition door. Provide 300 mm [1'-0"] of locker room bench per 2 lockers provided. Provide a wall mounted hand-held electric hair dryer for each lavatory; mount adjacent to mirrors. Provide fire extinguishers in semi-recessed fire extinguisher cabinets to comply with applicable codes

2-3.4.2.4 Finishes:
Floor: porcelain tile, or ceramic tile.
Base: porcelain tile, or ceramic tile.
Walls: ceramic tile, or 1800 mm high ceramic tile wainscot with painted impact resistant gypsum wallboard or painted concrete masonry units above.
Ceiling: painted Portland cement plaster, or suspended cement board with synthetic finish system.

2-3.4.2.5 Other requirements:

2-3.4.3 **Janitor Closet**. Provide one at each group of Locker Rooms. Minimum area: 6.5 m^2 [70 sf]. Room shall be accessed from the exterior or from a common interior space (corridor or vestibule); access directly from Men's or Women's Locker Room is not acceptable. If exterior door to Janitor's Closet is provided, provide a covered sidewalk between Janitor's Closet and locker rooms.

2-3.4.3.1 Function: Sink and storage of cleaning supplies, soap, paper products.

2-3.4.3.2 Adjacency requirements: Adjacent to Men's and Women's locker rooms.

2-3.4.3.3 Furnishings/Fixtures/Equipment (FFE): Provide one floor mounted mop sink, mop rack for three mops, and minimum 3000 linear mm of wall mounted stainless steel shelving.

2-3.4.3.4 Minimum Finishes:
Floor: ceramic tile, or sealed concrete
Base: resilient cove base, or ceramic tile base
Walls: painted water-resistant gypsum wallboard, or painted concrete masonry units
Ceiling: painted gypsum wallboard, painted veneer plaster, or painted Portland cement plaster

2-3.4.4 Other requirements: Door shall have classroom function (F84) lockset.

2-3.5 **EXTERIOR EQUIPMENT WASH AREA.** Provide paved exterior equipment wash areas near exterior entrance to the COF Supply Area. Provide 16 wash stations for large COFs, 10 wash atations for medium COFs, and 6 wash stations for small COFs. Each wash station will include a hose bib, catch basin, and drying rack (handrail).

2-3.5.1 Function: Exterior area for washing equipment prior to entering building.

2-3.5.2 Adjacency requirements: Locate in exterior service area, near entrance to COF Supply Area.

2-3.5.2 Furnishings/Fixtures/Equipment: Provide drainage assembly: Removable 900 mm x 900 mm aluminum or stainless steel grating, with non-slip surface, supported by concrete storm drainage inlet box. Filtered runoff shall be piped to storm drainage system. Provide freeze-proof wall hydrant with aerator nozzle mounted approximately 400 mm above grating, control valve mounted at 800 mm above pavement. Provide 3'-0" long metal grab bar above control valve, mounted at 1000 mm above pavement. Top of grating and concrete structure shall align with adjacent concrete sidewalk. Provide concrete sidewalk between boot wash area and entrance sidewalk.

2.3.5.3 Minimum Finishes: refer to exterior building material requirements.

2-3.5.4 Other requirements: Provide adequate drainage away from building.

2-4 **BATTALION HEADQUARTERS (HQ) FUNCTIONAL AND AREA REQUIREMENTS.** The battalion HQ building(s) shall consist of administrative areas, soldier services (chaplain) areas, classrooms, and support spaces. Provide facilities for [__] large battalions, [__] medium battalions, and [__] small battalions. Net areas of classroom and support spaces are the same for each size battalion; net areas of administrative spaces vary with battalion size. Total gross area of each size battalion HQ shall not exceed the following: Large battalion 1452 m^2 [15,629 sf]; medium battalion __ m^2 [___ sf]; small battalion ___ m^2 [_____ sf]. Total gross building area of all battalion HQ buildings shall not exceed [____] m^2 [_____ sf] [Maximum gross area shall be as shown on form DD 1391]. Each battalion may occupy a separate building, or multiple battalion headquarters may be grouped into one building. Buildings may be one or two stories in height. In a two-story configuration, classroom area, service core, soldier support offices, personnel administration clerk (PAC), and S-4 offices shall be located on the first floor; The command section, service core, S-1, S-2, and S-3 offices may be located on the second floor. One elevator is required. Grouping multiple battalion

headquarters in one building is encouraged, however, each battalion must function independently, and each battalion's spaces shall be readily identifiable. A common lobby, stairs, toilets, and elevator may be used; common mechanical rooms may be used, but mechanical and electrical systems must provide each battalion with independent operation and control. To the greatest extent possible, buildings shall be arranged to allow future reconfiguration of battalion sizes, and internal reorganization of office spaces: fixed elements such as toilets, equipment rooms, and core areas shall be located at the perimeter of administrative spaces; partitions separating administrative spaces should not be bearing walls.

Leadership and staff will manage the organization, receive visitors, and conduct the business of the battalion from the administrative areas (Command section, S-1, S-2, S-3, S-4, and PAC). Soldiers will visit the facility to conduct administrative business, attend training classes, or meet with support personnel (Chaplain's office). Military personnel will staff the facility; military and non-military personnel will visit the facility to meet with leadership or attend meetings. Although only able-bodied military personnel will be on staff, all spaces except shower rooms, and utility areas (janitor closets, mechanical, electrical, communication, and elevator machine rooms) shall comply with handicapped accessibility requirements. Functions and areas are as follows:

2-4.1 **Command Section**. Provide one group of offices, with accompanying reception area, coffee area and private toilet. In a two-story building locate Command Section on the second floor. Command section shall be adjacent to, and accessed through, the S-1 Clerical/Central Files area.

2-4.1.1 **Commanding Officer (CO)**. Provide one; 20.9 m^2 [225 sf]. Room shall be accessed through the Reception Area. Occupants: 1, and occasional visitors.

2-4.1.1.1 Function: Private office for battalion commanding officer.

2-4.1.1.2 Adjacency requirements: Adjacent to Reception Area, S-1 Clerical /Central Files. Adjacent to or near command section toilet, coffee area, Executive Officer and Command Sergeant Major offices [modify this sentence to require direct access doors from CO to XO and CSM offices only if this is a *must-have* user requirement; requiring doors between these offices places additional restrictions on design of the floor plan].

2-4.1.1.3 Furnishings/Fixtures/Equipment: Provide and design room to accommodate one desk [____] one credenza [____], one bookcase [___], two legal-size four-drawer file cabinets, one conference table [___], six side chairs, and one desk chair.

2-4.1.1.4 Minimum Finishes:
Floor: carpet
Base: resilient base
Walls: painted gypsum wallboard or painted veneer plaster
Ceiling: suspended acoustical panel ceiling

2-4.1.1.5 Other requirements: Provide 900 mm [3'-0"] wide door into room; door shall have entry function (F81) lockset. Room shall have exterior window. Partitions shall have minimum STC rating of 55.

2-4.1.2 **Executive Officer (XO)**. Provide one; 8.8 m^2 [95 sf]. Room shall be accessed through the Reception Area. Occupants: 1, and occasional visitors.

2-4.1.2.1 Function: Private office for battalion executive officer.

2-4.1.2.2 Adjacency requirements: Adjacent to Reception Area, S-1 Clerical /Central Files. Adjacent to or near command section toilet, coffee area, CO office and Command Sergeant Major office. [modify this sentence if direct access door from CO to XO is required].

2-4.1.2.3 Furnishings/Fixtures/Equipment: Provide and design room to accommodate one desk [____] with return [____], one bookcase [___], two legal-size four-drawer file cabinets, one side chair, and one desk chair.

2-4.1.2.4 Minimum Finishes:
Floor: carpet
Base: resilient base
Walls: painted gypsum wallboard or painted veneer plaster
Ceiling: suspended acoustical panel ceiling

2-4.1.2.5 Other requirements: Provide 900 mm [3'-0"] wide door into room; door shall have entry function (F81) lockset. Room shall have exterior window. Partitions shall have minimum STC rating of 55.

2-4.1.3 **Command Sergeant Major (CSM)**. Provide one; 8.8 m^2 [95 sf]. Room shall be accessed through the Reception Area. Occupants: 1, and occasional visitors.

2-4.1.3.1 Function: Private office for battalion command sergeant major.

2-4.1.3.2 Adjacency requirements: Adjacent to Reception Area, S-1 Clerical /Central Files. Adjacent to or near command section toilet, coffee area, CO office and Command Sergeant Major office. [modify this sentence if direct access door from CO to XO is required].

2-4.1.3.3 Furnishings/Fixtures/Equipment: Provide and design room to accommodate one desk [____] with return [____], one bookcase [___], two legal-size four-drawer file cabinets, one side chair, and one desk chair.

2-4.1.3.4 Minimum Finishes:
Floor: carpet
Base: resilient base
Walls: painted gypsum wallboard or painted veneer plaster
Ceiling: suspended acoustical panel ceiling

2-4.1.2.5 Other requirements: Provide 900 mm [3'-0"] wide door into room; door shall have entry function (F81) lockset. Room shall have exterior window. Partitions shall have minimum STC rating of 55.

2-4.1.4 **Reception Area**. Provide one; 13.9 m^2 [150 sf], to accommodate reception desk and waiting area. Reception area shall be accessed through S-1 Clerical/Central Files. Occupants: 1, and space for four visitors.

2-4.1.4.1 Function: Receptionist workstation and waiting area for visitors to the CO, XO, CSM offices.

2-4.1.4.2 Adjacency requirements: Adjacent (and open to) S-1 Clerical /Central Files area.

Adjacent to command section toilet, coffee area, CO, XO and Command Sergeant Major offices.

2-4.1.4.3 Furnishings/Fixtures/Equipment: Provide and design area to accommodate one reception desk (systems furniture workstation type [___]), four side chairs and one magazine table.

2-4.1.4.4 Minimum Finishes:
Floor: carpet
Base: resilient base
Walls: painted gypsum wallboard or painted veneer plaster
Ceiling: suspended acoustical panel ceiling

2-4.1.4.5 Other requirements:

2-4.1.5 **Command Section Toilet**. Provide one private toilet room. Room shall be sized to comply with handicap accessibility requirements. Room shall be accessed from reception area

2-4.1.5.1 Function: single-occupant toilet and lavatory, for use by command staff and visitors.

2-4.1.5.2 Adjacency requirements: Adjacent to reception area. Near CO, XO, and CSM offices.

2-4.1.5.3 Furnishings/Fixtures/Equipment (FFE): Provide one floor mounted toilet, one wall-hung lavatory, mirror with shelf above lavatory, Paper towel dispenser/waste receptacle, soap dispenser, toilet tissue dispenser, and wall mounted grab bars at toilet.

2-4.1.5.4 Minimum Finishes:
Floor: porcelain tile, or ceramic tile.
Base: porcelain tile, or ceramic tile.
Walls: ceramic tile
Ceiling: painted gypsum wallboard, painted veneer plaster, or painted Portland cement plaster.

2-4.1.5.5 Other requirements: Door shall have privacy function (F76) lockset. Arrange space so that door does not open directly into reception area. Partitions shall have minimum STC rating of 49.

2-4.1.6 **Coffee Area**. Provide one. Area shall have countertop with kitchen sink; comply with handicap accessibility requirements.

2-4.1.6.1 Function: Sink and space for coffee maker and supplies; for use by command section staff and visitors.

2-4.1.6.2 Adjacency requirements: Adjacent to reception area. Near CO, XO, and CSM offices. Locate to avoid conflicts with circulation pattern.

2-4.1.6.3 Furnishings/Fixtures/Equipment (FFE): Provide minimum 1200 mm wide x 600 mm deep [4'-0" x 2'-0"] plastic laminate countertop, with stainless steel kitchen sink. Provide minimum 1200 mm of wall cabinets; mounted to provide 600 mm clearance above countertop [verify with user that proposed coffee maker will fit in this space]. Provide dedicated electrical receptacle for coffee maker (coffee maker not in contract).

2-4.1.6.4 Minimum Finishes:

Floor: porcelain tile, or ceramic tile.
Base: porcelain tile, or ceramic tile.
Walls: painted gypsum wallboard or painted veneer plaster.
Ceiling: suspended acoustical panel ceiling.

2-4.1.6.5 Other requirements:

2-4.2 **S-1 Section**. Provide one group of offices. In a two-story building locate S-1 Section on the second floor. Locate S-1 Section adjacent to S-2 and/or S-3 Sections. Command Section shall be accessed through the S-1 Clerical/Central Files area.

2-4.2.1 **S-1 Officer**. Provide one; 8.8 m^2 [95 sf]. Room shall be accessed through the S-1 Clerical/Central Files area. Occupants: 1, and occasional visitors.

2-4.2.1.1 Function: Private office for S-1 officer.

2-4.2.1.2 Adjacency requirements: Adjacent to S-1 Clerical /Central Files. Near Command Section offices.

2-4.2.1.3 Furnishings/Fixtures/Equipment: Provide and design room to accommodate one desk [____] with return [____], one bookcase [___], two legal-size four-drawer file cabinets, one side chair, and one desk chair.

2-4.2.1.4 Minimum Finishes:
Floor: carpet
Base: resilient base
Walls: painted gypsum wallboard or painted veneer plaster
Ceiling: suspended acoustical panel ceiling

2-4.2.1.5 Other requirements: Provide 900 mm [3'-0"] wide door into room; door shall have entry function (F81) lockset. Room shall have exterior window. Partitions shall have minimum STC rating of 55.

2-4.2.2 **S-1 Clerical/Central Files**. Provide one; 62.3 m^2 [670 sf]. S-1 Clerical/Central Files shall be accessed from the lobby or corridor. The area shall have direct access to S-1 and Command Section private offices, and reception area. Occupants: 7 staff and occasional visitors.

2-4.2.2.1 Function: Open office area for S-1 admin staff; access to S-1 and Command offices.

2-4.2.2.2 Adjacency requirements: Adjacent to lobby or corridor. Adjacent to S-1 and Command private offices. Adjacent (and open to) reception area.

2-4.2.2.3 Furnishings/Fixtures/Equipment: Provide and design room to accommodate seven type [___] systems furniture workstations.

2-4.2.2.4 Minimum Finishes:
Floor: carpet
Base: resilient base
Walls: painted gypsum wallboard or painted veneer plaster

Ceiling: suspended acoustical panel ceiling

2-4.2.2.5 Other requirements: Provide 900 mm [3'-0"] wide door into room; door shall have entry function (F81) lockset. Exterior window is desirable. Partitions shall have minimum STC rating of 49. Minimum ceiling height 2642 mm [8'-8"].

2-4.3 **S-2 Section**. Provide one group of offices. In a two-story building locate S-2 Section on the second floor. Locate S-2 Section adjacent to S-1 and/or S-3 Sections.

2-4.3.1 **S-2 Officer**. Provide one; 8.8 m^2 [95 sf]. Room shall be accessed through the S-2 Clerical/Central Files area. Occupants: 1, and occasional visitors.

2-4.3.1.1 Function: Private office for S-2 officer.

2-4.3.1.2 Adjacency requirements: Adjacent to S-2 Clerical /Central Files.

2-4.3.1.3 Furnishings/Fixtures/Equipment: Provide and design room to accommodate one desk [____] with return [____], one bookcase [___], two legal-size four-drawer file cabinets, one side chair, and one desk chair.

2-4.3.1.4 Minimum Finishes:
Floor: carpet
Base: resilient base
Walls: painted gypsum wallboard or painted veneer plaster
Ceiling: suspended acoustical panel ceiling

2-4.3.1.5 Other requirements: Provide 900 mm [3'-0"] wide door into room; door shall have entry function (F81) lockset. Room shall have exterior window. Partitions shall have minimum STC rating of 55.

2-4.3.2 **Office**. Provide two; each 8.8 m^2 [95 sf]. Area may be a private office or a systems furniture workstation accessed through the S-4 Clerical/Central Files area. Occupants: 1 in each office [verify with user].

2-4.3.2.1 Function: Private office for use by S-2 personnel.

2-4.3.2.2 Adjacency requirements: Adjacent to S-2 Clerical /Central Files.

2-4.3.2.3 Furnishings/Fixtures/Equipment: Provide and design room to accommodate one desk [____] with return [____], one bookcase [___], two legal-size four-drawer file cabinets, one side chair, and one desk chair. If systems furniture panels are provided in lieu of drywall partitions, provide workstation type ___.

2-4.3.2.4 Minimum Finishes:
Floor: carpet
Base: resilient base
Walls: painted gypsum wallboard or painted veneer plaster
Ceiling: suspended acoustical panel ceiling

2-4.3.2.5 Other requirements: Exterior window is desirable. If drywall partitions are used, provide 900 mm [3'-0"] wide door into each room; door shall have entry function (F81) lockset.

Drywall partitions shall have minimum STC rating of 49.

2-4.3.3 **S-2 Clerical/Central Files**. Provide one; 76.2 m^2 [820 sf]. S-2 Clerical/Central Files shall be accessed from the lobby or corridor. The area shall have direct access to S-2 private offices, and the Secured Documents Vault. Occupants: 8 staff , and occasional visitors.

2-4.3.3.1 Function: Open office area for S-2 admin staff; access to other S-2 spaces.

2-4.3.3.2 Adjacency requirements: Adjacent to lobby or corridor. Adjacent to S-2 private offices and Secured Documents Vault.

2-4.3.3.3 Furnishings/Fixtures/Equipment: Provide and design room to accommodate eight type [___] systems furniture workstations.

2-4.3.3.4 Minimum Finishes:
Floor: carpet
Base: resilient base
Walls: painted gypsum wallboard or painted veneer plaster
Ceiling: suspended acoustical panel ceiling

2-4.3.3.5 Other requirements: Provide 900 mm [3'-0"] wide door into room; door shall have entry function (F81) lockset. Exterior window is desirable. Partitions shall have minimum STC rating of 49. Minimum ceiling height 2642 mm [8'-8"].

2-4.3.4 **Secured Documents Vault**. Provide one room; 13 m^2 [140 sf]. Vault shall be certified for open storage of secret material. Class M Modular construction is acceptable. Provide Class 5 vault door with day gate [verify all vault criteria with user]. To allow future flexibility in reconfiguring offices areas, locate vault on the perimeter of the administrative areas. Occupants: 1.

2-4.3.4.1 Function: Storage of documents classified 'secret' and below. Workspace for one clerk.

2-4.3.4.2 Adjacency requirements: Adjacent to and accessed from S-2 Clerical/Central Files.

2-4.3.4.3 Furnishings/Fixtures/Equipment: Provide and design room to accommodate one desk [____] with return [____], [insert shelving or file cabinet requirements], and one desk chair.

2-4.3.4.4 Minimum Finishes:
Floor: carpet or vinyl composition tile
Base: resilient base
Walls: painted or pre-finished modular vault panels
Ceiling: painted or pre-finished modular vault panels

2-4.3.4.5 Other requirements:

2-4.4 **S-3 Section**. Provide one group of offices. In a two-story building locate S-3 Section on the second floor. Locate S-3 Section adjacent to S-1 and/or S-2 Sections.

2-4.4.1 **S-3 Officer**. Provide one; 8.8 m^2 [95 sf]. Room shall be accessed through the S-3

Clerical/Central Files area. Occupants: 1, and occasional visitors.

2-4.4.1.1 Function: Private office for S-3 officer.

2-4.4.1.2 Adjacency requirements: Adjacent to S-3 Clerical /Central Files.

2-4.4.1.3 Furnishings/Fixtures/Equipment: Provide and design room to accommodate one desk [____] with return [____], one bookcase [___], two legal-size four-drawer file cabinets, one side chair, and one desk chair.

2-4.4.1.4 Minimum Finishes:
Floor: carpet
Base: resilient base
Walls: painted gypsum wallboard or painted veneer plaster
Ceiling: suspended acoustical panel ceiling

2-4.4.1.5 Other requirements: Provide 900 mm [3'-0"] wide door into room; door shall have entry function (F81) lockset. Room shall have exterior window. Partitions shall have minimum STC rating of 55.

2-4.4.2 **Office**. Provide two; each 8.8 m^2 [95 sf]. Area may be a private office or a systems furniture workstation accessed through the S-3 Clerical/Central Files area. Occupants: 1 in each office [verify with user].

2-4.4.2.1 Function: Private office or systems furniture workstation for use by S-3 personnel.

2-4.4.2.2 Adjacency requirements: Adjacent to S-3 Clerical /Central Files.

2-4.4.2.3 Furnishings/Fixtures/Equipment: Provide and design room to accommodate one desk [____] with return [____], one bookcase [___], two legal-size four-drawer file cabinets, one side chair, and one desk chair. If systems furniture panels are provided in lieu of drywall partitions, provide workstation type ___.

2-4.4.2.4 Minimum Finishes:
Floor: carpet
Base: resilient base
Walls: painted gypsum wallboard or painted veneer plaster
Ceiling: suspended acoustical panel ceiling

2-4.4.2.5 Other requirements: Exterior window is desirable. If drywall partitions are used, provide 900 mm [3'-0"] wide door into each room; door shall have entry function (F81) lockset. Drywall partitions shall have minimum STC rating of 49.

2-4.4.3 **S-3 Clerical/Central Files**. Provide one; 76.2 m^2 [820 sf]. S-3 Clerical/Central Files shall be accessed from the lobby or corridor. The area shall have direct access to S-3 private offices. Occupants: 8 staff , and occasional visitors.

2-4.4.3.1 Function: Open office area for S-3 admin staff; access to S-3 offices.

2-4.4.3.2 Adjacency requirements: Adjacent to lobby or corridor. Adjacent to S-3 private offices.

2-4.4.3.3 Furnishings/Fixtures/Equipment: Provide and design room to accommodate eight type [___] systems furniture workstations.

2-4.4.3.4 Minimum Finishes:
Floor: carpet
Base: resilient base
Walls: painted gypsum wallboard or painted veneer plaster
Ceiling: suspended acoustical panel ceiling

2-4.4.3.5 Other requirements: Provide 900 mm [3'-0"] wide door into room; door shall have entry function (F81) lockset. Exterior window is desirable. Partitions shall have minimum STC rating of 49. Minimum ceiling height 2642 mm [8'-8"].

2-4.5 **Conference Room**. Provide one; 36 m^2 [387 sf] Room shall be located to allow direct access from the main corridor/lobby and the Command Section/S-1 Section. In a two-story building, conference room will be located on the second floor. Occupants: up to 26 persons.

2-4.5.1 Function: Conference room for battalion leadership, staff, and visitors. Functions will include staff meetings, hearings, disciplinary sessions, training.

2-4.5.2 Adjacency requirements: Adjacent to lobby or main corridor, S-1 Section, Command Section. Near S-2 and S-3 Sections.

2-4.5.3 Furnishings/Fixtures/Equipment: Provide and design room to accommodate [Coordinate furniture requirements with user]. Provide one marker board (minimum 2400 mm wide x 1200 mm high [8'-0" x 4'-0"]) and one 2400 mm wide [8'-0"] wall mounted pull-down projection screen.

2-4.5.4 Minimum Finishes:
Floor: carpet
Base: resilient base
Walls: painted gypsum wallboard or painted veneer plaster
Ceiling: suspended acoustical panel ceiling

2-4.5.5 Other requirements: Provide 900 mm [3'-0"] wide doors into room; doors shall have classroom function (F84) lockset. Partitions shall have minimum STC rating of 55. Minimum ceiling height 2642 mm [8'-8"].

2-4.6 **S-4 Section**. Provide one group of offices. In a two-story building locate S-4 Section on the first floor. Locate S-4 Section adjacent to PAC Section.

2-4.6.1 **S-4 Officer**. Provide one; 8.8 m^2 [95 sf]. Room shall be accessed through the S-4 Clerical/Central Files area. Occupants: 1, and occasional visitors.

2-4.6.1.1 Function: Private office for S-4 officer.

2-4.6.1.2 Adjacency requirements: Adjacent to S-4 Clerical /Central Files.

2-4.6.1.3 Furnishings/Fixtures/Equipment: Provide and design room to accommodate one

desk [____] with return [____], one bookcase [___], two legal-size four-drawer file cabinets, one side chair, and one desk chair.

2-4.6.1.4 Minimum Finishes:
Floor: carpet
Base: resilient base
Walls: painted gypsum wallboard or painted veneer plaster
Ceiling: suspended acoustical panel ceiling

2-4.6.1.5 Other requirements: Provide 900 mm [3'-0"] wide door into room; door shall have entry function (F81) lockset. Room shall have exterior window. Partitions shall have minimum STC rating of 55.

2-4.6.2 **Office**. Provide two; each 8.8 m^2 [95 sf]. Area may be a private office or a systems furniture workstation accessed through the S-4 Clerical/Central Files area. Occupants: 1 in each office [verify with user].

2-4.6.2.1 Function: Private office or systems furniture workstation for use by S-4 personnel.

2-4.6.2.2 Adjacency requirements: Adjacent to S-4 Clerical /Central Files.

2-4.6.2.3 Furnishings/Fixtures/Equipment: Provide and design each area to accommodate one desk [____] with return [____], one bookcase [___], two legal-size four-drawer file cabinets, one side chair, and one desk chair. If systems furniture panels are provided in lieu of drywall partitions, provide workstation type ___.

2-4.6.2.4 Minimum Finishes:
Floor: carpet
Base: resilient base
Walls: painted gypsum wallboard or painted veneer plaster
Ceiling: suspended acoustical panel ceiling

2-4.6.2.5 Other requirements: Exterior window is desirable. If drywall partitions are used, provide 900 mm [3'-0"] wide door into each room; door shall have entry function (F81) lockset. Drywall partitions shall have minimum STC rating of 49.

2-4.6.3 **S-4 Clerical/Central Files**. Provide one; 76.2 m^2 [820 sf]. S-4 Clerical/Central Files shall be accessed from the lobby or corridor. The area shall have direct access to S-4 private offices. Occupants: 8 staff , and occasional visitors.

2-4.6.3.1 Function: Open office area for S-4 admin staff; access to S-4 offices.

2-4.6.3.2 Adjacency requirements: Adjacent to lobby or corridor. Adjacent to S-4 private offices.

2-4.6.3.3 Furnishings/Fixtures/Equipment: Provide and design room to accommodate eight type [___] systems furniture workstations.

2-4.6.3.4 Finishes:
Floor: carpet
Base: resilient base

Walls: painted gypsum wallboard or painted veneer plaster
Ceiling: suspended acoustical panel ceiling

2-4.6.3.5 Other requirements: Provide 900 mm [3'-0"] wide door into room; door shall have entry function (F81) lockset. Exterior window is desirable. Partitions shall have minimum STC rating of 49. Minimum ceiling height 2642 mm [8'-8"].

2-4.6.4 **S-4 Storage & Supplies**. Provide one; 24.2 m2 [260sf] of general storage space. Room shall be under control of, and accessed from, S-4/Clerical/Central Files area. Room shall be located on exterior wall, with exterior doors leading to paved sidewalk [add requirement for vehicle access if necessary]. .

2-4.6.4.1 Function: Storage of [identify type of items to be stored] for S-4 Section.

2-4.6.4.2 Adjacency requirements: Adjacent to S-4 Clerical/Central Files and building exterior.

2-4.6.4.3 Furnishings/Fixtures/Equipment: [insert shelving requirement].

2-4.6.4.4 Finishes: Floor: sealed concrete
Base: resilient cove base
Walls: painted gypsum wallboard or painted veneer plaster, or painted concrete masonry units
Ceiling: suspended acoustical panel ceiling

2-4.6.5 Other requirements: Provide 900 mm [3'-0"] wide door into room from S-4/Clerical/Central Files; provide pair of 900 mm [3'-0"] wide outswinging hollow metal exterior doors. Doors shall have storeroom function (F86) locksets; exterior doors shall have hold open devices and auxiliary deadlocks (thumb turn inside, keyed cylinder outside). Provide minimum 2400 mm [8'-0"] wide exterior sidewalk between exterior doors and the main sidewalk leading to main entry area [modify if paved vehicle loading area is required].

2-4.7 **Personnel Administration Center (PAC) Section**. Provide one group of offices. In a two-story building locate PAC Section on the first floor. Locate PAC Section adjacent to S-4 Section.

2-4.7.1 **PAC Officer**. Provide one; 8.8 m^2 [95 sf]. Room shall be accessed through the PAC Clerical/Central Files area. Occupants: 1, and occasional visitors.

2-4.7.1.1 Function: Private office for S-4 officer.

2-4.7.1.2 Adjacency requirements: Adjacent to PAC Clerical /Central Files.

2-4.7.1.3 Furnishings/Fixtures/Equipment: Provide and design room to accommodate one desk [____] with return [____], one bookcase [___], two legal-size four-drawer file cabinets, one side chair, and one desk chair.

2-4.7.1.4 Minimum Finishes:
Floor: carpet
Base: resilient base
Walls: painted gypsum wallboard or painted veneer plaster
Ceiling: suspended acoustical panel ceiling

2-4.7.1.5 Other requirements: Provide 900 mm [3'-0"] wide door into room; door shall have entry function (F81) lockset. Room shall have exterior window. Partitions shall have minimum STC rating of 55.

2-4.7.2 **Office**. Provide two; each 8.8 m^2 [95 sf]. Area may be a private office or a systems furniture workstation accessed through the PAC Clerical/Central Files area. Occupants: 1 in each office [verify with user].

2-4.7.2.1 Function: Private office or systems furniture workstation for use by PAC personnel.

2-4.7.2.2 Adjacency requirements: Adjacent to PAC Clerical /Central Files.

2-4.7.2.3 Furnishings/Fixtures/Equipment: Provide and design each area to accommodate one desk [____] with return [____], one bookcase [___], two legal-size four-drawer file cabinets, one side chair, and one desk chair. If systems furniture panels are provided in lieu of drywall partitions, provide workstation type ___.

2-4.7.2.4 Minimum Finishes:
Floor: carpet
Base: resilient base
Walls: painted gypsum wallboard or painted veneer plaster
Ceiling: suspended acoustical panel ceiling

2-4.7.2.5 Other requirements: Exterior window is desirable. If drywall partitions are used, provide 900 mm [3'-0"] wide door into each room; door shall have entry function (F81) lockset. Drywall partitions shall have minimum STC rating of 49.

2-4.7.2.6 **PAC Clerical/Central Files**. Provide one; 76.2 m^2 [820 sf]. S-4 Clerical/Central Files shall be accessed from the lobby or corridor. The area shall have direct access to PAC private offices. Occupants: 8 staff , and occasional visitors.

2-4.7.2.7 Function: Open office area for PAC admin staff; access to PAC offices and Message Mail Center.

2-4.7.2.8 Adjacency requirements: Adjacent to lobby or corridor. Adjacent to PAC private offices and Message Mail Center. Near Duty Officer.

2-4.7.2.9 Furnishings/Fixtures/Equipment: Provide and design room to accommodate eight type [___] systems furniture workstations.

2-4.7.2.10 Minimum Finishes:
Floor: carpet
Base: resilient base
Walls: painted gypsum wallboard or painted veneer plaster
Ceiling: suspended acoustical panel ceiling

2-4.7.3 Other requirements: Provide 900 mm [3'-0"] wide door into room; door shall have entry function (F81) lockset. Exterior window is desirable. Partitions shall have minimum STC rating of 49. Minimum ceiling height 2642 mm [8'-8"].

2-4.7.4 **Duty Officer**. Provide one; 8.8 m^2 [95 sf]. Room shall be accessed from the main

lobby. Occupants: 1.

2-4.7.4.1 Function: Duty Officer will provide physical security of the building, and visual control of the entrances and lobby, as well as functioning as an information source for visitors.

2-4.7.4.2 Adjacency requirements: Adjacent to lobby and main entrance; near PAC Clerical /Central Files.

2-4.7.4.3 Furnishings/Fixtures/Equipment: Provide and design room to accommodate one desk [____] with return [____], one legal-size four-drawer file cabinet, one side chair, and one desk chair.

2-4.7.4.4 Minimum Finishes:
Floor: carpet
Base: resilient base
Walls: painted gypsum wallboard or painted veneer plaster
Ceiling: suspended acoustical panel ceiling

2-4.7.4.5 Other requirements: Provide 900 mm [3'-0"] wide door into room; door shall have entry function (F81) lockset and glass vision panel. Provide duty officer counter (built-in casework) minimum 1800 mm [6'-0"] long separating the Duty Officer room from the lobby/corridor. The counter on the corridor side shall be minimum 1500 mm [5'-0"] wide x 1016 mm [3'-4"] high x 300 mm [12"] deep; provide locking overhead coiling shutter to secure the opening when unattended; shutter hood shall not be visible from corridor side. [modify requirement for sliding pass-through window above counter if requested by user].

2-4.7.5 **Message Mail Center**. Provide one; 8.8 m^2 [95 sf]. Room shall be accessed from the PAC Clerical/Central Files area. Occupants: [___].

2-4.7.5.1 Function: Mail sorting [add to description of function].

2-4.7.5.2 Adjacency requirements: Adjacent to corridor and PAC Clerical /Central Files.

2-4.7.5.3 Furnishings/Fixtures/Equipment: Provide and design room to accommodate [insert furniture requirements]

2-4.7.5.4 Minimum Finishes:
Floor: vinyl composition tile, or porcelain tile
Base: resilient base, or porcelain tile base
Walls: painted gypsum wallboard or painted veneer plaster
Ceiling: suspended acoustical panel ceiling

2-4.7.5.5 Other requirements: Provide 900 mm [3'-0"] wide door into room; door shall have entry function (F81) lockset and glass vision panel. Provide counter (built-in casework) minimum 1800 mm [6'-0"] long separating the Message Mail Center from the corridor. The counter on the corridor side shall be minimum 1500 mm [5'-0"] wide x 1016 mm [3'-4"] high x 300 mm [12"] deep; provide locking overhead coiling shutter to secure the opening when unattended; shutter hood shall not be visible from corridor side [modify requirement for sliding pass-through window above counter if requested by user].

2-4.8 **Soldier Services**. Provide one group of offices. In a two-story building locate

soldier services on the first floor. Soldier services are unrelated to other battalion administration functions.

2-4.8.1 **Chaplain's Assistant**. Provide one; 12.1 m^2 [130 sf]. Room shall be accessed from the lobby or main corridor. Occupants: 1, and visitors.

2-4.8.1.1 Function: Private office for Chaplain's Assistant and waiting area for visitors to Chaplain's office.

2-4.8.1.2 Adjacency requirements: Adjacent to lobby or main corridor.

2-4.8.1.3 Furnishings/Fixtures/Equipment: Provide and design room to accommodate one desk [____] with return [____], one bookcase [___], four side chairs, and one desk chair.

2-4.8.1.4 Minimum Finishes:
Floor: carpet
Base: resilient base
Walls: painted gypsum wallboard or painted veneer plaster
Ceiling: suspended acoustical panel ceiling

2-4.8.1.5 Other requirements: Provide 900 mm [3'-0"] wide door into room; door shall have entry function (F81) lockset. Exterior window is desirable. Partitions shall have minimum STC rating of 55.

2-4.8.2 **Chaplain**. Provide one; 12.1 m^2 [130 sf]. Room shall be accessed from the Chaplain's Assistant office. Occupants: 1, and visitors.

2-4.8.2.1 Function: Private office for Chaplain and visitors.

2-4.8.2.2 Adjacency requirements: Adjacent to Chaplain's Assistant. May have additional door to corridor.

2-4.8.2.3 Furnishings/Fixtures/Equipment: Provide and design room to accommodate one desk [____] with return [____], one bookcase [___],one desk chair, and [insert furniture requirements].

2-4.8.2.4 Minimum Finishes:
Floor: carpet
Base: resilient base
Walls: painted gypsum wallboard or painted veneer plaster
Ceiling: suspended acoustical panel ceiling

2-4.8.2.5 Other requirements: Provide 900 mm [3'-0"] wide door into room; door shall have entry function (F81) lockset. Room shall have exterior window. Partitions shall have minimum STC rating of 55.

2-4.9 **Classroom Areas**. Provide one group of classrooms and adjacent Learning Resource Center for each battalion. In a two-story building locate Classroom Area on the first floor. Classrooms and Learning Resource Center will be accessed from the lobby or main corridor. The three classrooms shall be divided by operable panel partitions and provided with appropriate entrances and exits to allow two or three rooms to be combined for use as one large

classroom.

2-4.9.1 **Classroom**. Provide three; minimum area 86 m^2 [926 sf] each. Each classroom shall be located to allow direct access from the main corridor/lobby, and direct egress out of the building. In a two-story building, classrooms will be located on the first floor. Occupants: up to 60 persons in each room [verify with user].

2-4.9.1.1 Function: Soldier training and other meetings.

2-4.9.1.2 Adjacency requirements: Adjacent to lobby or main corridor; adjacent to exterior wall. Locate all three classrooms together to allow use as larger room. Near toilets.

2-4.9.1.3 Furnishings/Fixtures/Equipment: Provide and design room to accommodate [Coordinate furniture requirements with user]. Walls separating classrooms shall be operable panel partitions with minimum STC rating of 47. Provide one marker board (minimum 3658 mm wide x 1200 mm high [12'-0" x 4'-0"]) and one 2400 mm wide [8'-0"] wall mounted pull-down projection screen [Coordinate with user and add requirements for cable television outlets, television support brackets, or other equipment; identify whether equipment is to be contractor or government provided].

2-4.9.1.4 Minimum Finishes:
Floor: carpet
Base: resilient base
Walls: painted gypsum wallboard or painted veneer plaster
Ceiling: suspended acoustical panel ceiling, and painted gypsum wallboard or painted veneer plaster

2-4.9.1.5 Other requirements: Provide 900 mm [3'-0"] wide doors into room; doors shall have classroom function (F84) lockset. Permanent partitions shall have minimum STC rating of 49. Minimum ceiling height 2642 mm [8'-8"] at perimeter, 3000 mm [10'-0"] in main portion of room.

2-4.9.2 **Learning Resource Center**. Provide one; minimum area 31.6 m^2 [340 sf]. Provide direct access from the main corridor/lobby. In a two-story building, Learning Resource Center will be located on the first floor. Occupants: up to 22 persons [verify with user].

2-4.9.2.1 Function: Soldier training and other meetings.

2-4.9.2.2 Adjacency requirements: Adjacent to lobby or main corridor. Near classrooms and toilets.

2-4.9.2.3 Furnishings/Fixtures/Equipment: Provide and design room to accommodate [Coordinate furniture requirements with user]. Partitions shall have minimum STC rating of 49. Provide one marker board (minimum 2400 mm wide x 1200 mm high [8'-0" x 4'-0"]) and one 2400 mm wide [8'-0"] wall mounted pull-down projection screen.

2-4.9.2.4 Minimum Finishes:
Floor: carpet
Base: resilient base
Walls: painted gypsum wallboard or painted veneer plaster
Ceiling: suspended acoustical panel ceiling, and painted gypsum wallboard or painted veneer plaster

2-4.9.2.5 Other requirements: Provide 900 mm [3'-0"] wide doors into room; doors shall have classroom function (F84) lockset. Permanent partitions shall have minimum STC rating of 49. Minimum ceiling height 2642 mm [8'-8"] at perimeter, 3000 mm [10'-0"] in main portion of room.

2-4.10 **Battalion HQ Common Areas**. Provide the following areas in each building. Handicapped accessibility is required in all common areas except janitor closet and shower rooms.

2-4.10.1 **Lobby and Corridors**. Provide as required to allow access to building spaces. Unless otherwise required, minimum width of main corridors providing access to classroom area shall not be less than 2400 mm [8'-0"]; minimum width of other main corridors shall not be less than 1800 mm [6'-0"]. Corridor width shall comply with applicable egress codes.

2-4.10.1.1 Function: Entry to the facility; egress and circulation through the building.

2-4.10.1.2 Adjacency requirements: Adjacent to main entrances and vertical circulation. It is preferable to enter lobby/main corridor from two sides of the building.

2-4.10.1.3 Furnishings/Fixtures/Equipment: Provide wall mounted electric water cooler. Provide mechanical and electrical systems to comply with applicable codes. Provide fire extinguishers in semi-recessed fire extinguisher cabinets to comply with applicable codes. Provide recessed space for three vending machines per building (machines are not in contract). Provide interior signage to identify major spaces. Provide two recessed trophy cases (minimum size: 2400 mm wide x 1500 high x 400 mm deep) per battalion; provide one recessed building directory near each main entrance; in a two-story building, provide one recessed building directory near second floor elevator doors. Provide one 1200 mm high x 1800 mm wide [4'-0" x 6'-0"] wall mounted bulletin board.

2-4.10.1.4 Minimum Finishes:
Floor: porcelain tile, vinyl composition tile, or carpet.
Base: porcelain tile, stained wood base, or resilient cove base.
Walls: painted gypsum wallboard, or painted veneer plaster.
Ceiling: suspended acoustical panel ceiling

2-4.10.1.5 Other requirements: Handicap accessible.

2-4.10.2 **Entry Vestibules**. Provide at each exterior entrance to lobby/main corridor area. [<u>If climate dictates, revise this sentence to require vestibules at all entrances to the building</u>.]

2-4.10.1.1 Function: Primary entry point into the facility; weather protection for interior spaces.

2-4.10.1.2 Adjacency requirements: Adjacent to lobby/main corridor.

2-4.10.1.3 Furnishings/Fixtures/Equipment:

2-4.10.1.4 Minimum Finishes:
Floor: Provide recessed entry mat full depth of vestibule x full width of doors; porcelain tile, or quarry tile in remainder of room.
Base: porcelain tile or quarry tile
Walls: Match exterior wall finish material, or painted gypsum wallboard, or painted veneer plaster

Ceiling: painted gypsum wallboard, painted veneer plaster, or painted Portland cement plaster.

2-4.10.1.5 Other requirements: Handicap accessible.

2-4.10.2 **Interior Stairs**. Provide as required to allow circulation to upper floor of the building, and to comply with applicable code egress requirements.

2-4.10.2.1 Function: Circulation and means of egress.

2-4.10.2.2 Adjacency requirements: Adjacent to corridors. Connects all floors of the building.

2-4.10.2.3 Furnishings/Fixtures/Equipment: Stairs shall be steel construction with concrete-filled treads, or cast-in-place concrete construction. Open risers are prohibited. Provide mechanical and electrical systems to comply with applicable codes.

2-4.10.2.4 Minimum Finishes:
Landing floor: porcelain tile, quarry tile, resilient tile, vinyl composition tile, or sealed concrete.
Base: porcelain tile, quarry tile, or resilient cove base.
Treads: porcelain tile, quarry tile, resilient treads, or sealed concrete. Provide slip-resistant nosing if tile is used.
Risers: painted steel, porcelain tile, quarry tile, or sealed concrete.
Walls: painted gypsum wallboard, or painted concrete masonry units.
Ceiling: suspended acoustical panel ceiling, painted gypsum wallboard, painted veneer plaster, or painted Portland cement plaster.

2-4.10.2.5 Other requirements: Stairs shall comply with handicap accessibility requirements of applicable codes. Railings shall be painted steel, or prefinished aluminum.

2-4.10.3 **Men's Toilet Room(s)**. Provide one or more rooms, sized to accommodate the number of plumbing fixtures required for each battalion served. In a two-story structure, one of the required toilet fixtures and one of the required lavatories shall be provided in a single occupant male toilet room on the second floor. If two battalion headquarters are combined in one building, the required number of fixtures may be combined in one male toilet room on each floor of the building. Toilet rooms will be accessed from corridors. Arrange entrance to provide visual privacy.

2-4.10.3.1 Function: Restrooms for male occupants.

2-4.10.3.2 Adjacency requirements: Adjacent to corridor.

2-4.10.3.3 Furnishings/Fixtures/Equipment: Provide 3 lavatories, 4 floor mounted toilets, and 2 wall-hung urinals for each battalion. Lavatories in single-occupant toilet rooms shall be wall-hung; lavatories in gang toilets shall be countertop mounted. Countertops shall be plastic laminate or solid surfacing material. Provide toilet partitions at each toilet, and urinal partitions between urinals. Provide the following toilet accessories: one mirror with shelf above each wall-hung lavatory; one continuous mirror full width of countertop at countertop mounted lavatories; one paper towel dispenser/waste receptacle per toilet room; one soap dispenser per lavatory; one toilet tissue dispenser per toilet; one robe hook on each toilet partition door.

2-4.10.3.4 Minimum Finishes:
Floor: porcelain tile, or ceramic tile.

Base: porcelain tile, or ceramic tile.
Walls: ceramic tile, or 1800 mm high ceramic tile wainscot with painted impact resistant gypsum wallboard or painted concrete masonry units above.
Ceiling: painted Portland cement plaster, or painted gypsum wallboard or veneer plaster.

2-4.10.3.5 Other requirements:

2-4.10.4 **Women's Toilet Room(s)**. Provide one or more rooms, sized to accommodate the number of plumbing fixtures required for each battalion served. In a two-story structure, one of the required toilet fixtures and one of the required lavatories shall be provided in a single occupant female toilet room on the second floor. If two battalion headquarters are combined in one building, the required number of fixtures may be combined in one female toilet room on each floor of the building. Toilet rooms will be accessed from corridors. Arrange entrance to provide visual privacy.

2-4.10.4.1 Function: Restrooms for female occupants.

2-4.10.4.2 Adjacency requirements: Adjacent to corridor.

2-4.10.4.3 Furnishings/Fixtures/Equipment: Provide 4 lavatories and 4 floor mounted toilets for each battalion. Lavatories in single-occupant toilet rooms shall be wall-hung; lavatories in gang toilets shall be countertop mounted. Countertops shall be plastic laminate or solid surfacing material. Provide toilet partitions at each toilet. Provide the following toilet accessories: one mirror with shelf above each wall-hung lavatory; one continuous mirror full width of countertop at countertop mounted lavatories; one paper towel dispenser/waste receptacle per toilet room; one soap dispenser per lavatory; one toilet tissue dispenser per toilet; one sanitary napkin disposal at each toilet; one robe hook on each toilet partition door.

2-4.10.4.4 Minimum Finishes:
Floor: porcelain tile, or ceramic tile.
Base: porcelain tile, or ceramic tile.
Walls: ceramic tile, or 1800 mm high ceramic tile wainscot with painted impact resistant gypsum wallboard or painted concrete masonry units above.
Ceiling: painted Portland cement plaster, or painted gypsum wallboard or veneer plaster.

2-4.10.4.5 Other requirements:

2-4.10.5 **Shower Room**. Provide two. Rooms shall be used by able-bodied military personnel only. Rooms shall be accessed from Administrative Area Corridor. Shower room shall not be combined with toilet rooms. In a two-story building, shower rooms may be located on first or second floor.

2-4.10.5.1 Function: Private shower and dressing room for use by battalion staff.

2-4.10.5.2 Adjacency requirements: Adjacent to corridor. Near toilets.

2-4.10.5.3 Furnishings/Fixtures/Equipment: Provide one ceramic tile shower with rod and shower curtain. Shower shall have ceramic soap holder and wall mounted grab bar. Dressing area shall have bench, four towel/robe hooks, and wall mounted full-length mirror. Provide floor drain at dressing area, locate outside of circulation path.

2-4.10.5.4 Minimum Finishes:
Floor: ceramic tile.
Base: ceramic tile.
Walls: ceramic tile
Ceiling: painted Portland cement plaster.

2-4.10..6.5 Other requirements:

2-4.10.6 **Janitor Closet**. Provide one at each group of toilets on each floor of the building. Minimum area: 2.8 m^2 [30 sf]. Room shall be accessed from the corridor.

2-4.10.6.1 Function: Sink and storage of cleaning supplies, soap, paper products.

2-4.10.6.2 Adjacency requirements: Near toilets and shower rooms.

2-4.10.6.3 Furnishings/Fixtures/Equipment: Provide one floor mounted mop sink, mop rack for two mops, and minimum 1800 linear mm of wall mounted stainless steel shelving.

2-4.10.6.4 Minimum Finishes:
Floor: ceramic tile, or sealed concrete
Base: resilient cove base, or ceramic tile base
Walls: painted water-resistant gypsum wallboard, or painted concrete masonry units
Ceiling: painted gypsum wallboard, painted veneer plaster, or painted Portland cement plaster

2-4.10.6.5 Other requirements: Door shall have classroom function (F84) lockset.

2-4.10.7 **Storage**. Provide minimum 9.3 m2 [100sf] of general storage space. In a two-story building provide half of the area on each floor. Each room shall be dedicated to one battalion. Storage rooms will be accessed from the corridor.

2-4.10.7.1 Function: Storage of [identify type of items to be stored] for the battalion.

2-4.10.7.2 Adjacency requirements: Adjacent to corridor.

2-4.10.7.3 Furnishings/Fixtures/Equipment: [insert shelving requirement].

2-4.10.7.4 Minimum Finishes:
Floor: sealed concrete
Base: resilient cove base
Walls: painted gypsum wallboard or painted veneer plaster, or painted concrete masonry units
Ceiling: suspended acoustical panel ceiling

2-4.10.7.5 Other requirements: Door shall have storeroom function (F86) lockset.

2-4.11 **Battalion HQ Support Areas**. Provide the following areas in each battalion HQ building. Handicapped accessibility is not required in mechanical rooms, electrical and communications closets, and elevator machine room. All other support spaces shall be handicap accessible.

2-4.11.1 **Mechanical Room(s)**. Provide dedicated areas for mechanical equipment. Each battalion shall have independent operation and control of HVAC system for its own spaces, but

mechanical equipment may serve more than one battalion, and mechanical rooms may be combined. Mechanical rooms shall not be used for storage or other purposes. Access will be limited to authorized personnel. Size and locate room(s) to allow equipment removal and maintenance. Provide floor openings and vertical shaft spaces as necessary.

2-4.11.1.1 Function: Spaces for HVAC, water heating, and other plumbing and mechanical equipment.

2-4.11.1.2 Adjacency requirements: Locate to allow efficient distribution. Mechanical rooms located on the ground floor shall have doors opening to the exterior. Mechanical rooms on second floor shall be accessed from corridors.

2-4.11.1.3 Furnishings/Fixtures/Equipment: As required by Statement of Work.

2-4.11.1.4 Minimum Finishes:
Floor: sealed concrete
Base: resilient cove base, or none.
Walls: painted gypsum wallboard or painted veneer plaster, or painted concrete masonry units
Ceiling: none required

2-4.11.1.5 Other requirements: Doors shall have storeroom function (F86) locksets.

2-4.11.2 **Electrical Room(s)**. Provide dedicated areas for electrical equipment. Each battalion shall have independent metering and control of the electrical system for its own spaces, but electrical equipment may serve more than one battalion, and electrical rooms may be combined. Electrical rooms shall not be used for storage or other purposes. Access will be limited to authorized personnel. Size and locate room(s) to allow equipment removal and maintenance.

2-4.11.2.1 Function: Spaces for electrical equipment.

2-4.11.2.2 Adjacency requirements: Locate to allow efficient distribution. Electrical rooms shall be accessed from the exterior or from corridors.

2-4.11.2.3 Furnishings/Fixtures/Equipment: As required by Statement of Work.

2-4.11.2.4 Minimum Finishes:
Floor: sealed concrete
Base: resilient cove base
Walls: painted gypsum wallboard or painted veneer plaster, or painted concrete masonry units
Ceiling: none required.

2-4.11.2.5 Other requirements: Electrical service to buildings shall be underground. Doors shall have storeroom function (F86) locksets.

2-4.11.3 **Communication Room**. Provide dedicated room(s) for communication distribution equipment. Each room shall be dedicated to a single battalion, and shall not be combined with mechanical or electrical rooms. Provide each battalion with one main communication room; minimum size 3000 mm [10’-0”] x 3300 mm [11’-0”]. In two-story buildings, the communication room shall be located on the second floor. Provide additional communication rooms as needed; all spaces having telephone or computer data outlets shall be located to allow a maximum cable length

of 90 m [295 feet] between outlet and communication room. Minimum dimensions of secondary communication rooms shall be 2100 mm [7;-0"] x 3000 mm [10'-0"]. Provide floor openings and vertical shaft spaces as necessary. Rooms shall be accessed from corridors. Access will be limited to authorized personnel.

2-4.11.3.1 Function: Distribution areas for telephone, data network, and cable television.

2-4.11.3.2 Adjacency requirements: Adjacent to corridor. Locate to allow efficient distribution.

2-4.11.3.3 Furnishings/Fixtures/Equipment: As required by Statement of Work.

2-4.11.3.4 Minimum Finishes:
Floor: vinyl composition tile.
Base: resilient cove base
Walls: painted gypsum wallboard or painted veneer plaster, or painted concrete masonry units
Ceiling: painted gypsum wallboard, painted veneer plaster, or suspended acoustical panel ceiling

2-4.11.3.5 Other requirements: Door shall have minimum 900 mm [3'-0"] wide door with storeroom function (F86) lockset. Provide three 100 mm [4"] cempty conduits connecting vertically stacked communication rooms.

2-4.11.4 **Elevator Machine Room**. Provide one in each two-story battalion HQ building. Size to comply with equipment and code requirements.

2-4.11.4.1 Function: Space for hydraulic elevator equipment.

2-4.11.4.2 Adjacency requirements: Adjacent to elevator and corridor.

2-4.11.4.3 Furnishings/Fixtures/Equipment: As required by Statement of Work

2-4.11.4.4 Minimum Finishes:
Floor: sealed concrete
Base: resilient cove base
Walls: painted gypsum wallboard or painted veneer plaster, or painted concrete masonry units
Ceiling: none required.

2-4.11.4.5 Other requirements:

2-4.11.5 **Elevator**. Provide one hydraulic passenger elevator in each two-story battalion HQ.

2-4.11.5.1 Function: Vertical conveyance of people and furniture.

2-4.11.5.2 Adjacency requirements: Adjacent to lobby or main corridor.

2-4.11.5.3 Furnishings/Fixtures/Equipment: Passenger elevator: 2,500 lb. capacity, minimum 75 feet per minute speed; center opening doors. Refer to Chapter 5 for additional requirements.

2-4.11.5.4 Cab minimum finishes:
Floor: carpet
Walls: plastic laminate
Ceiling: suspended aluminum egg crate

Car door and front: satin finish stainless steel
Hoistway entrance doors and frame: satin finish stainless steel

2-4.11.5.5 Other requirements: Handicapped accessible.

2-5 **BRIGADE HEADQUARTERS FACILITY FUNCTIONAL AND AREA REQUIREMENTS.** The brigade headquarters (HQ) building shall consist of administrative areas, soldier services areas, and support spaces. Provide one single-story brigade HQ building. Total gross building area shall not exceed 972.9 square meters (m^2) [10,473 square feet (sf)] [Maximum gross area shall be as shown on form DD 1391]. To the greatest extent possible, the building shall be arranged to allow future reconfiguration of administrative office spaces: fixed elements such as toilets, equipment rooms, and core areas shall be located at the perimeter of administrative spaces; partitions separating administrative spaces should not be bearing walls.

Leadership and staff will manage the organization, receive visitors, and conduct the business of the brigade from the administrative areas (Command section, S-1/PAC, S-2, S-3, and S-4). Military personnel will staff the facility; military and non-military personnel will visit the facility to meet with leadership or soldier services staff (Chaplain, Surgeon, re-enlistment office). All spaces except shower rooms, and utility areas (janitor closets, mechanical, electrical, communication rooms) shall comply with handicapped accessibility requirements. Building spaces and areas shall be as follows:

2-5.1 **Command Section**. Provide one group of offices, with accompanying reception area, coffee area and private toilet. Command section shall be adjacent to the S-1/PAC Clerical/Central Files area. Reception area shall have direct access to corridor/lobby.

2-5.1.1 **Commanding Officer (CO)**. Provide one; 21 m^2 [226 sf]. Room shall be accessed through the Reception Area. Occupants: 1, and occasional visitors.

2-5.1.1.1 Function: Private office for battalion commanding officer.

2-5.1.1.2 Adjacency requirements: Adjacent to Reception Area, S-1 Clerical /Central Files. Adjacent to or near command section toilet, coffee area, Executive Officer and Command Sergeant Major offices [modify this sentence to require direct access doors from CO to XO and CSM offices only if this is a *must-have* user requirement; requiring doors between these offices places additional restrictions on design of the floor plan]. Adjacent to Conference Room; provide door from CO office into Conference Room.

2-5.1.1.3 Furnishings/Fixtures/Equipment: Provide and design room to accommodate one desk [____] one credenza [____], one bookcase [___], two legal-size four-drawer file cabinets, one conference table [___], six side chairs, and one desk chair.

2-5.1.1.4 Minimum Finishes:
Floor: carpet
Base: resilient base
Walls: painted gypsum wallboard or painted veneer plaster
Ceiling: suspended acoustical panel ceiling

2-5.1.1.5 Other requirements: Provide 900 mm [3'-0"] wide doors into room from reception area and from Conference Room; doors shall have entry function (F81) lockset (CO office is

secure side). Room shall have exterior window. Partitions shall have minimum STC rating of 55.

2-5.1.2 **Executive Officer (XO)**. Provide one; 13.9 m^2 [150 sf]. Room shall be accessed through the Reception Area. Occupants: 1, and occasional visitors.

2-5.1.2.1 Function: Private office for brigade executive officer.

2-5.1.2.2 Adjacency requirements: Adjacent to Reception Area, S-1/PAC Clerical /Central Files. Adjacent to or near command section toilet, coffee area, CO office and Command Sergeant Major office. [modify this sentence if direct access door from CO to XO is required].

2-5.1.2.3 Furnishings/Fixtures/Equipment: Provide and design room to accommodate one desk [____] with return [____], one bookcase [___], two legal-size four-drawer file cabinets, three side chairs, and one desk chair.

2-5.1.2.4 Minimum Finishes:
Floor: carpet
Base: resilient base
Walls: painted gypsum wallboard or painted veneer plaster
Ceiling: suspended acoustical panel ceiling

2-4.1.2.5 Other requirements: Provide 900 mm [3'-0"] wide door into room; door shall have entry function (F81) lockset. Room shall have exterior window. Partitions shall have minimum STC rating of 55.

2-5.1.3 **Command Sergeant Major (CSM)**. Provide one; 13.9 m^2 [150 sf]. Room shall be accessed through the Reception Area. Occupants: 1, and occasional visitors.

2-5.1.3.1 Function: Private office for brigade command sergeant major.

2-5.1.3.2 Adjacency requirements: Adjacent to Reception Area, S-1 Clerical /Central Files. Adjacent to or near command section toilet, coffee area, CO office and Command Sergeant Major office. [modify this sentence if direct access door from CO to XO is required].

2-5.1.3.3 Furnishings/Fixtures/Equipment: Provide and design room to accommodate one desk [____] with return [____], one bookcase [___], two legal-size four-drawer file cabinets, three side chairs, and one desk chair.

2-5.1.3.4 Minimum Finishes:
Floor: carpet
Base: resilient base
Walls: painted gypsum wallboard or painted veneer plaster
Ceiling: suspended acoustical panel ceiling

2-4.1.2.6 Other requirements: Provide 900 mm [3'-0"] wide door into room; door shall have entry function (F81) lockset. Room shall have exterior window. Partitions shall have minimum STC rating of 55.

2-5.1.4 **Reception Area**. Provide one area; 23.2 m^2 [250 sf] for reception desk and waiting area. Reception area shall be accessed directly from corridor/lobby, and also through the

S-1/PAC Clerical/Central Files area. Occupants: 1, and space for six visitors.

2-5.1.4.1 Function: Receptionist workstation and waiting area for visitors to CO, XO, CSM offices.

2-5.1.4.2 Adjacency requirements: Adjacent to S-1/PAC Clerical/Central Files; adjacent to lobby or corridor. Adjacent to command section toilet, coffee area, CO, XO and Command Sergeant Major offices.

2-5.1.4.3 Furnishings/Fixtures/Equipment: Provide and design area to accommodate one reception desk (systems furniture workstation type [___]), six side chairs and one magazine table.

2-5.1.4.4 Minimum Finishes:
Floor: carpet
Base: resilient base
Walls: painted gypsum wallboard or painted veneer plaster
Ceiling: suspended acoustical panel ceiling

2-5.1.4.5 Other requirements:

2-5.1.5 **Command Section Toilet**. Provide one private toilet room. Room shall be sized to comply with handicap accessibility requirements. Room shall be accessed from reception area.

2-5.1.5.1 Function: single-occupant toilet and lavatory, for use by command staff and visitors.

2-5.1.5.2 Adjacency requirements: Adjacent to reception area. Near CO, XO, and CSM offices.

2-5.1.5.3 Furnishings/Fixtures/Equipment (FFE): Provide one floor mounted toilet, one wall-hung lavatory, mirror with shelf above lavatory, Paper towel dispenser/waste receptacle, soap dispenser, toilet tissue dispenser, and wall mounted grab bars at toilet.

2-5.1.5.4 Minimum Finishes:
Floor: porcelain tile, or ceramic tile.
Base: porcelain tile, or ceramic tile.
Walls: ceramic tile
Ceiling: painted gypsum wallboard, painted veneer plaster, or painted Portland cement plaster.

2-5.1.5.5 Other requirements: Door shall have privacy function (F76) lockset. Arrange space so that door does not open directly into reception area. Partitions shall have minimum STC rating of 49.

2-5.1.6 **Coffee Area**. Provide one. Area shall have countertop with kitchen sink; comply with handicap accessibility requirements.

2-5.1.6.1 Function: Sink and space for coffee maker and supplies; for use by command section staff and visitors.

2-5.1.6.2 Adjacency requirements: Adjacent to Reception Area. Near CO, XO, and CSM offices. Locate to avoid conflicts with circulation pattern.

2-5.1.6.3 Furnishings/Fixtures/Equipment (FFE): Provide minimum 1200 mm wide x 600 mm deep [4'-0" x 2'-0"] plastic laminate countertop, with stainless steel kitchen sink. Provide minimum 1200 mm of wall cabinets; mounted to provide 600 mm clearance above countertop [verify with user that proposed coffee maker will fit in this space]. Provide dedicated electrical receptacle for coffee maker (coffee maker not in contract).

2-5.1.6.4 Minimum Finishes:
Floor: porcelain tile, or ceramic tile.
Base: porcelain tile, or ceramic tile.
Walls: painted gypsum wallboard or painted veneer plaster.
Ceiling: suspended acoustical panel ceiling.

2-5.1.6.5 Other requirements:

2-5.2 **S-1/PAC Section**. Provide one group of offices.

2-5.2.1 **S-1 Officer**. Provide one; 8.8 m^2 [95 sf]. Room shall be accessed through the S-1/PAC Clerical/Central Files area. Occupants: 1, and occasional visitors.

2-5.2.1.1 Function: Private office for S-1 officer.

2-5.2.1.2 Adjacency requirements: Adjacent to S-1/PAC Clerical/Central Files. Near Command Section offices.

2-5.2.1.3 Furnishings/Fixtures/Equipment: Provide and design room to accommodate one desk [____] with return [____], one bookcase [___], two legal-size four-drawer file cabinets, one side chair, and one desk chair.

2-5.2.1.4 Minimum Finishes:
Floor: carpet
Base: resilient base
Walls: painted gypsum wallboard or painted veneer plaster
Ceiling: suspended acoustical panel ceiling

2-5.2.1.5 Other requirements: Provide 900 mm [3'-0"] wide door into room; door shall have entry function (F81) lockset. Room shall have exterior window. Partitions shall have minimum STC rating of 55.

2-5.2.2 **Office**. Provide three; each 8.8 m^2 [95 sf]. Area may be a private office or a systems furniture workstation accessed through the S-1/PAC Clerical/Central Files area. Occupants: 1 in each office [verify with user].

2-5.2.2.1 Function: Private office for use by S-1/PAC personnel.

2-5.2.2.2 Adjacency requirements: Adjacent to S-1/PAC Clerical /Central Files.

2-5.2.2.3 Furnishings/Fixtures/Equipment: Provide and design room to accommodate one desk [____] with return [____], one bookcase [___], two legal-size four-drawer file cabinets, one side chair, and one desk chair. If systems furniture panels are provided in lieu of drywall partitions, provide workstation type ___.

2-5.2.2.4 Minimum Finishes:
Floor: carpet
Base: resilient base
Walls: painted gypsum wallboard or painted veneer plaster
Ceiling: suspended acoustical panel ceiling

2-5.2.2.5 Other requirements: Exterior window is desirable. If drywall partitions are used, provide 900 mm [3'-0"] wide door into each room; door shall have entry function (F81) lockset. Drywall partitions shall have minimum STC rating of 49.

2-5.2.3 **S-1/PAC Clerical/Central Files**. Provide one; 113 m^2 [1,216 sf]. S-1 Clerical/Central Files shall be accessed from the lobby or corridor. The area shall have direct access to S-1/PAC and Command Section private offices. Occupants: 10 staff and occasional visitors.

2-5.2.3.1 Function: Open office area for S-1/PAC admin staff; access to S-1/PAC and Command offices.

2-5.2.3.2 Adjacency requirements: Adjacent to lobby or corridor. Adjacent to S-1/PAC and Command private offices.

2-5.2.3.3 Furnishings/Fixtures/Equipment: Provide and design room to accommodate ten type [___] systems furniture workstations.

2-5.2.3.4 Minimum Finishes:
Floor: carpet
Base: resilient base
Walls: painted gypsum wallboard or painted veneer plaster
Ceiling: suspended acoustical panel ceiling

2-5.2.3.5 Other requirements: Provide 900 mm [3'-0"] wide door into room; door shall have entry function (F81) lockset. Exterior window is desirable. Partitions shall have minimum STC rating of 49. Minimum ceiling height 2642 mm [8'-8"].

2-5.2.4 **Duty Officer**. Provide one; 8.9 m^2 [96 sf]. Room shall be located to have visual control of the lobby/main corridor. Occupants: 1.

2-5.2.4.1 Function: Duty Officer will provide physical security of the building, and visual control of the entrances and lobby, as well as functioning as an information source for visitors.

2-5.2.4.2 Adjacency requirements: Adjacent to lobby/main corridor; adjacent to, and accessed from, S-1/PAC Clerical /Central Files.

2-5.2.4.3 Furnishings/Fixtures/Equipment: Provide and design room to accommodate one desk [____] with return [____], one legal-size four-drawer file cabinet, one side chair, and one desk chair.

2-5.2.4.4 Minimum Finishes:
Floor: carpet
Base: resilient base
Walls: painted gypsum wallboard or painted veneer plaster

Ceiling: suspended acoustical panel ceiling

2-5.2.4.5 Other requirements: Provide 900 mm [3'-0"] wide door into room from S-1/PAC Clerical Central Files area.; door shall have entry function (F81) lockset and glass vision panel. Provide duty officer counter (built-in casework) minimum 1800 mm [6'-0"] long separating the Duty Officer room from the lobby/corridor. The counter on the corridor side shall be minimum 1500 mm wide x 1016 mm high x 300 mm deep; provide locking overhead coiling shutter to secure the opening when unattended; shutter hood shall not be visible from corridor side. [modify requirement for sliding pass-through window above counter if requested by user].

2-5.2.5 **Message Mail Center**. Provide one; 19 m^2 [205 sf]. Room shall be accessed from the PAC Clerical/Central Files area. Occupants: [___].

2-5.2.5.1 Function: Mail sorting [add to description of function].

2-5.2.5.2 Adjacency requirements: Adjacent to corridor/lobby; adjacent to, and accessed from, S-1/PAC Clerical/Central Files.

2-5.2.5.3 Furnishings/Fixtures/Equipment: Provide and design room to accommodate [insert furniture requirements]

2-5.2.5.4 Minimum Finishes:
Floor: vinyl composition tile, or porcelain tile
Base: resilient base, or porcelain tile base
Walls: painted gypsum wallboard or painted veneer plaster
Ceiling: suspended acoustical panel ceiling

2-5.2.5.5 Other requirements: Provide 900 mm [3'-0"] wide door into room; door shall have entry function (F81) lockset and glass vision panel. Provide counter (built-in casework) minimum 1800 mm [6'-0"] long separating the Message Mail Center from the corridor. The counter on the corridor side shall be minimum 1500 mm wide x 1016 mm high x 300 mm deep; provide locking overhead coiling shutter to secure the opening when unattended; shutter hood shall not be visible from corridor side [modify requirement for sliding pass-through window above counter if requested by user].

2-5.2.6 **Supply Room**. Provide one; 12 m2 [130sf]. Room shall be under control of, and located near, S-1/PAC Clerical/Central Files area. Room will be used by all administrative sections; provide access from main corridor.

2-5.2.6.1 Function: Storage of [identify type of items to be stored] for administrative sections.

2-5.2.6.2 Adjacency requirements: Adjacent to main corridor; near S-1 Clerical/Central Files and other admin functions.

2-5.2.6.3 Furnishings/Fixtures/Equipment: [insert shelving requirement].

2-5.2.6.4 Minimum Finishes:
Floor: sealed concrete, or vinyl composition tile
Base: resilient cove base
Walls: painted gypsum wallboard or painted veneer plaster, or painted concrete masonry units
Ceiling: suspended acoustical panel ceiling

2-5.2.6.5 Other requirements: Provide 900 mm [3'-0"] wide door into room from corridor; door shall have storeroom function (F86) lockset;

2-5.3 **S-2 Section**. Provide one group of offices.

2-5.3.1 **S-2 Officer**. Provide one; 8.8 m^2 [95 sf]. Room shall be accessed through the S-2 Clerical/Central Files area. Occupants: 1, and occasional visitors.

2-5.3.1.1 Function: Private office for S-2 officer.

2-5.3.1.2 Adjacency requirements: Adjacent to S-2 Clerical/Central Files.

2-5.3.1.3 Furnishings/Fixtures/Equipment: Provide and design room to accommodate one desk [____] with return [____], one bookcase [___], two legal-size four-drawer file cabinets, one side chair, and one desk chair.

2-5.3.1.4 Minimum Finishes:
Floor: carpet
Base: resilient base
Walls: painted gypsum wallboard or painted veneer plaster
Ceiling: suspended acoustical panel ceiling

2-5.3.1.5 Other requirements: Provide 900 mm [3'-0"] wide door into room; door shall have entry function (F81) lockset. Room shall have exterior window. Partitions shall have minimum STC rating of 55.

2-5.3.2 **Signal Office**. Provide one; each 14.8 m^2 [160 sf]. Room shall be accessed through the S-2 Clerical/Central Files area. Occupants: 1 [verify with user].

2-5.3.2.1 Function: Private office for Signal Officer [verify function with user].

2-5.3.2.2 Adjacency requirements: Adjacent to S-2 Clerical /Central Files.

2-5.3.2.3 Furnishings/Fixtures/Equipment: Provide and design room to accommodate one desk [____] with return [____], one bookcase [___], two legal-size four-drawer file cabinets, one side chair, and one desk chair [verify with user]

2-5.3.2.4 Minimum Finishes:
Floor: carpet
Base: resilient base
Walls: painted gypsum wallboard or painted veneer plaster
Ceiling: suspended acoustical panel ceiling

2-5.3.2.5 Other requirements: Room shall have exterior window. Provide 900 mm [3'-0"] wide door into room; door shall have entry function (F81) lockset. Partitions shall have minimum STC rating of 49.

2-5.3.3 **Office**. Provide one; each 8.8 m^2 [95 sf]. Area may be a private office or a systems furniture workstation accessed through the S-2 Clerical/Central Files area. Occupants: 1 [verify with user].

2-5.3.3.1 Function: Private office for use by S-2 personnel.

2-5.3.3.2 Adjacency requirements: Adjacent to S-2 Clerical /Central Files.

2-5.3.3.3 Furnishings/Fixtures/Equipment: Provide and design room to accommodate one desk [____] with return [____], one bookcase [___], two legal-size four-drawer file cabinets, one side chair, and one desk chair. If systems furniture panels are provided in lieu of drywall partitions, provide workstation type ___.

2-5.3.3.4 Minimum Finishes:
Floor: carpet
Base: resilient base
Walls: painted gypsum wallboard or painted veneer plaster
Ceiling: suspended acoustical panel ceiling

2-5.3.3.5 Other requirements: Exterior window is desirable. If drywall partitions are used, provide 900 mm [3'-0"] wide door into each room; door shall have entry function (F81) lockset. Drywall partitions shall have minimum STC rating of 49.

2-5.3.4 **S-2 Clerical/Central Files**. Provide one; 36 m^2 [388 sf]. S-2 Clerical/Central Files shall be accessed from the lobby or corridor. The area shall have direct access to S-2 private offices, Secured Documents Vault, and Signal office. Occupants: 4 staff, and occasional visitors.

2-5.3.4.1 Function: Open office area for S-2 admin staff; access to other S-2 spaces.

2-5.3.4.2 Adjacency requirements: Adjacent to lobby or corridor. Adjacent to S-2 private offices, Signal office, and Secured Documents Vault.

2-5.3.4.3 Furnishings/Fixtures/Equipment: Provide and design room to accommodate four type [___] systems furniture workstations.

2-5.3.4.4 Minimum Finishes:
Floor: carpet
Base: resilient base
Walls: painted gypsum wallboard or painted veneer plaster
Ceiling: suspended acoustical panel ceiling

2-5.3.4.5 Other requirements: Provide 900 mm [3'-0"] wide door into room; door shall have entry function (F81) lockset. Exterior window is desirable. Partitions shall have minimum STC rating of 49. Minimum ceiling height 2642 mm [8'-8"].

2-5.3.5 **Secured Documents Vault**. Provide one room; 14.9 m^2 [160 sf]. Vault shall be certified for open storage of secret material. Class M Modular construction is acceptable. Provide Class 5 vault door with day gate [verify all vault criteria with user]. To allow future flexibility in reconfiguring offices areas, locate vault on the perimeter of the administrative areas. Occupants: 1 [verify with user].

2-5.3.5.1 Function: Storage of documents classified 'secret' and below. Space for crypto equipment. Workspace for one clerk.

2-5.3.5.2 Adjacency requirements: Adjacent to and accessed from S-2 Clerical/Central Files.

2-5.3.5.3 Furnishings/Fixtures/Equipment: Provide and design room to accommodate one desk [____] with return [____], [insert shelving or file cabinet requirements], and one desk chair. [Insert crypto equipment requirements].

2-5.3.5.4 Minimum Finishes:
Floor: vinyl composition tile
Base: resilient base
Walls: painted or pre-finished modular vault panels
Ceiling: painted or pre-finished modular vault panels

2-5.3.5.5 Other requirements:

2-5.4 **S-3 Section**. Provide one group of offices.

2-5.4.1 **S-3 Officer**. Provide one; 8.8 m^2 [95 sf]. Room shall be accessed through the S-3 Clerical/Central Files area. Occupants: 1, and occasional visitors.

2-5.4.1.1 Function: Private office for S-3 officer.

2-5.4.1.2 Adjacency requirements: Adjacent to S-3 Clerical /Central Files.

2-5.4.1.3 Furnishings/Fixtures/Equipment: Provide and design room to accommodate one desk [____] with return [____], one bookcase [___], two legal-size four-drawer file cabinets, one side chair, and one desk chair.

2-5.4.1.4 Minimum Finishes:
Floor: carpet
Base: resilient base
Walls: painted gypsum wallboard or painted veneer plaster
Ceiling: suspended acoustical panel ceiling

2-5.4.1.5 Other requirements: Provide 900 mm [3'-0"] wide door into room; door shall have entry function (F81) lockset. Room shall have exterior window. Partitions shall have minimum STC rating of 55.

2-5.4.2 **Office**. Provide four; each 8.8 m^2 [95 sf]. Area may be a private office or a systems furniture workstation accessed through the S-3 Clerical/Central Files area. Occupants: 1 in each office [verify with user].

2-5.4.2.1 Function: Private office or systems furniture workstation for use by S-3 personnel.

2-5.4.2.2 Adjacency requirements: Adjacent to S-3 Clerical /Central Files.

2-5.4.2.3 Furnishings/Fixtures/Equipment: Provide and design room to accommodate one desk [____] with return [____], one bookcase [___], two legal-size four-drawer file cabinets, one side chair, and one desk chair. If systems furniture panels are provided in lieu of drywall partitions, provide workstation type ___.

2-5.4.2.4 Minimum Finishes:
Floor: carpet
Base: resilient base
Walls: painted gypsum wallboard or painted veneer plaster
Ceiling: suspended acoustical panel ceiling

2-5.4.2.5 Other requirements: Exterior window is desirable. If drywall partitions are used, provide 900 mm [3'-0"] wide door into each room; door shall have entry function (F81) lockset. Drywall partitions shall have minimum STC rating of 49.

2-5.4.3 **S-3 Clerical/Central Files**. Provide one; 94.8 m^2 [1,020 sf]. S-3 Clerical/Central Files shall be accessed from the lobby or corridor. The area shall have direct access to S-3 private offices. Occupants: 8 staff , and occasional visitors.

2-5.4.3.1 Function: Open office area for S-3 admin staff; access to S-3 offices.

2-5.4.3.2 Adjacency requirements: Adjacent to lobby or corridor. Adjacent to S-3 private offices.

2-5.4.3.3 Furnishings/Fixtures/Equipment: Provide and design room to accommodate eight type ___ systems furniture workstations.

2-5.4.3.4 Minimum Finishes:
Floor: carpet
Base: resilient base
Walls: painted gypsum wallboard or painted veneer plaster
Ceiling: suspended acoustical panel ceiling

2-5.4.3.5 Other requirements:
Provide 900 mm [3'-0"] wide door into room; door shall have entry function (F81) lockset. Exterior window is desirable. Partitions shall have minimum STC rating of 49. Minimum ceiling height 2642 mm [8'-8"].

2-5.5 **S-4 Section**. Provide one group of offices. In a two-story building locate S-4 Section on the first floor. Locate S-4 Section adjacent to PAC Section.
2-5.5.1 **S-4 Officer**. Provide one; 8.8 m^2 [95 sf]. Room shall be accessed through the S-4 Clerical/Central Files area. Occupants: 1, and occasional visitors.

2-5.5.1.1 Function: Private office for S-4 officer.

2-5.5.1.2 Adjacency requirements: Adjacent to S-4 Clerical /Central Files.

2-5.5.1.3 Furnishings/Fixtures/Equipment: Provide and design room to accommodate one desk [____] with return [____], one bookcase [___], two legal-size four-drawer file cabinets, one side chair, and one desk chair.

2-5.5.1.4 Minimum Finishes:
Floor: carpet
Base: resilient base
Walls: painted gypsum wallboard or painted veneer plaster
Ceiling: suspended acoustical panel ceiling

2-5.5.1.5 Other requirements: Provide 900 mm [3'-0"] wide door into room; door shall have entry function (F81) lockset. Room shall have exterior window. Partitions shall have minimum STC rating of 55.

2-5.5.2 **Office**. Provide two; each 8.8 m^2 [95 sf]. Area may be a private office or a systems furniture workstation accessed through the S-4 Clerical/Central Files area. Occupants: 1 in each office [verify with user].

2-5.5.2.1 Function: Private office or systems furniture workstation for use by S-4 personnel.

2-5.5.2.2 Adjacency requirements: Adjacent to S-4 Clerical /Central Files.

2-5.5.2.3 Furnishings/Fixtures/Equipment: Provide and design each area to accommodate one desk [____] with return [____], one bookcase [___], two legal-size four-drawer file cabinets, one side chair, and one desk chair. If systems furniture panels are provided in lieu of drywall partitions, provide workstation type ___.

2-5.5.2.4 Minimum Finishes:
Floor: carpet
Base: resilient base
Walls: painted gypsum wallboard or painted veneer plaster
Ceiling: suspended acoustical panel ceiling

2-5.5.2.5 Other requirements: Exterior window is desirable. If drywall partitions are used, provide 900 mm [3'-0"] wide door into each room; door shall have entry function (F81) lockset. Drywall partitions shall have minimum STC rating of 49.

2-5.5.3 **S-4 Clerical/Central Files**. Provide one; 58 m^2 [625 sf]. S-4 Clerical/Central Files shall be accessed from the lobby or corridor. The area shall have direct access to S-4 private offices. Occupants: 6 staff , and occasional visitors.

2-5.5.3.1 Function: Open office area for S-4 admin staff; access to S-4 offices.

2-5.5.3.2 Adjacency requirements: Adjacent to lobby or corridor. Adjacent to S-4 private offices.

2-5.5.3.3 Furnishings/Fixtures/Equipment: Provide and design room to accommodate six type ___ systems furniture workstations.

2-5.5.3.4 Minimum Finishes:
Floor: carpet
Base: resilient base
Walls: painted gypsum wallboard or painted veneer plaster
Ceiling: suspended acoustical panel ceiling

2-5.5.3.5 Other requirements: Provide 900 mm [3'-0"] wide door into room; door shall have entry function (F81) lockset. Exterior window is desirable. Partitions shall have minimum STC rating of 49. Minimum ceiling height 2642 mm [8'-8"].

2-5.6 **Conference Room**. Provide one; 36 m^2 [455 sf] Room shall be located to allow

direct access from the main corridor/lobby and the CO office. Occupants: up to 30 persons.

2-5.6.1 Function: Conference room for brigade leadership, staff, and visitors. Functions will include staff meetings, hearings, disciplinary sessions, training.

2-5.6.2 Adjacency requirements: Adjacent to lobby or corridor; adjacent to CO office. Near other administrative sections.

2-5.6.3 Furnishings/Fixtures/Equipment: Provide and design room to accommodate [Coordinate furniture requirements with user]. Provide one marker board (minimum 2400 mm wide x 1200 mm high [8'-0" x 4'-0"]) and one 2400 mm wide [8'-0"] wall mounted pull-down projection screen.

2-5.6.4 Minimum Finishes:
Floor: carpet
Base: resilient base
Walls: painted gypsum wallboard or painted veneer plaster
Ceiling: suspended acoustical panel ceiling

2-5.6.5 Other requirements: Provide 900 mm [3'-0"] wide doors into room; doors shall have classroom function (F84) lockset. Partitions shall have minimum STC rating of 55. Minimum ceiling height 2642 mm [8'-8"].

2-5.7 **Soldier Services**. Provide one group of offices. Soldier services are unrelated to other battalion administration functions; locate off of main lobby/corridor.

2-5.7.1 **Chaplain's Assistant**. Provide one; 7.9 m^2 [85 sf]. Room shall be accessed from the lobby or main corridor. Occupants: 1, and visitors.

2-5.7.1.1 Function: Private office for Chaplain's Assistant and waiting area for visitors to Chaplain's office.

2-5.7.1.2 Adjacency requirements: Adjacent to lobby or main corridor.

2-5.7.1.3 Furnishings/Fixtures/Equipment: Provide and design room to accommodate one desk [____] with return [____], one bookcase [___], two side chairs, and one desk chair.

2-5.7.1.4 Minimum Finishes:
Floor: carpet
Base: resilient base
Walls: painted gypsum wallboard or painted veneer plaster
Ceiling: suspended acoustical panel ceiling

2-5.7.1.5 Other requirements: Provide 900 mm [3'-0"] wide door into room; door shall have entry function (F81) lockset. Exterior window is desirable. Partitions shall have minimum STC rating of 55.

2-5.7.2 **Chaplain**. Provide one; 9.8 m^2 [105 sf]. Room shall be accessed from the Chaplain's Assistant office, and the corridor. Occupants: 1, and visitors.

2-5.7.2.1 Function: Private office for Chaplain and visitors.

2-5.7.2.2 Adjacency requirements: Adjacent to Chaplain's Assistant, and corridor

2-5.7.2.3 Furnishings/Fixtures/Equipment: Provide and design room to accommodate one desk [____] with return [____], one bookcase [___],one desk chair, and [insert furniture requirements].

2-5.7.2.4 Minimum Finishes:
Floor: carpet
Base: resilient base
Walls: painted gypsum wallboard or painted veneer plaster
Ceiling: suspended acoustical panel ceiling

2-5.7.2.5 Other requirements: Provide 900 mm [3'-0"] wide doors into room; doors shall have entry function (F81) lockset. Room shall have exterior window. Partitions shall have minimum STC rating of 55.

2-5.7.3 **Surgeon**. Provide one; 9.8 m^2 [105 sf]. Room shall be accessed from the corridor/lobby. Occupants: 1, and visitors.

2-5.7.3.1 Function: Private office for brigade surgeon (doctor).

2-5.7.3.2 Adjacency requirements: Adjacent to corridor/main lobby.

2-5.7.3.3 Furnishings/Fixtures/Equipment: Provide and design room to accommodate one desk [____] with return [____], one bookcase [___], one side chair, and one desk chair.

2-5.7.3.4 Minimum Finishes:
Floor: carpet
Base: resilient base
Walls: painted gypsum wallboard or painted veneer plaster
Ceiling: suspended acoustical panel ceiling

2-5.7.3.5 Other requirements: Provide 900 mm [3'-0"] wide door into room; door shall have entry function (F81) lockset. Room shall have exterior window. Partitions shall have minimum STC rating of 55.

2-5.7.4 **Supply Closet**. Provide one; 1.9 m^2 [20 sf]. Room shall be accessed from the corridor. Occupants: none.

2-5.7.4.1 Function: storage closet for supplies used by soldier services functions.

2-5.7.4.2 Adjacency requirements: Adjacent to soldier services spaces and corridor.

2-5.7.4.3 Furnishings/Fixtures/Equipment: Provide [add shelving requirement].

2-5.7.4.4 Minimum Finishes:
Floor: carpet or vinyl composition tile
Base: resilient base
Walls: painted gypsum wallboard or painted veneer plaster
Ceiling: suspended acoustical panel ceiling, painted gypsum wallboard, or painted veneer

plaster.

2-5.7.4.5 Other requirements:

2-5.8 **Brigade HQ Common Areas**. Provide the following areas in each building. Handicapped accessibility is required in all common areas except janitor closet and shower rooms.

2-5.8.1 **Lobby and Corridors**. Provide as required to allow access to building spaces. Unless otherwise required, minimum width of lobby/main corridor shall not be less than 3000 mm [10'-0"]; minimum width of other major corridors shall not be less than 1800 mm [6'-0"]. Corridor width shall comply with applicable egress codes.

2-5.8.1.1 Function: Entry to the facility; egress and circulation through the building.

2-5.8.1.2 Adjacency requirements: Adjacent to main entrances. It is preferable to enter lobby/main corridor from two sides of the building.

2-5.8.1.3 Furnishings/Fixtures/Equipment: Provide wall mounted electric water cooler. Provide mechanical and electrical systems to comply with applicable codes. Provide fire extinguishers in semi-recessed fire extinguisher cabinets to comply with applicable codes. Provide recessed space for one vending machine (machine is not in contract). Provide interior signage to identify major spaces. Provide two recessed trophy cases (minimum size: 2400 mm wide x 1500 high x 400 mm deep); provide one recessed building directory near each main entrance. Provide one 1200 mm high x 1800 mm wide [4'-0" x 6'-0"] wall mounted bulletin board.

2-5.8.1.4 Minimum Finishes:
Floor: porcelain tile, vinyl composition tile, or carpet.
Base: porcelain tile, stained wood base, or resilient cove base.
Walls: painted gypsum wallboard, or painted veneer plaster.
Ceiling: suspended acoustical panel ceiling

2-5.8.1.5 Other requirements: Handicap accessible.

2-5.8.2 **Entry Vestibules**. Provide at each exterior entrance to lobby/main corridor area. [<u>If climate dictates, revise this sentence to require vestibules at all entrances to the building</u>.]

2-5.8.1.1 Function: Primary entry point into the facility; weather protection for interior spaces.

2-5.8.1.2 Adjacency requirements: Adjacent to lobby/main corridor.

2-5.8.1.3 Furnishings/Fixtures/Equipment:

2-5.8.1.4 Minimum Finishes:
Floor: Provide recessed entry mat full depth of vestibule x full width of doors; porcelain tile, or quarry tile in remainder of room.
Base: porcelain tile or quarry tile
Walls: Match exterior wall finish material, or painted gypsum wallboard, or painted veneer plaster
Ceiling: painted gypsum wallboard, painted veneer plaster, or painted Portland cement plaster.

2-5.8.1.5 Other requirements: Handicap accessible.

2-5.8.2 **Men's Toilet Room**. Provide one room, sized to accommodate the number of plumbing fixtures required. Toilet room will be accessed from corridors. Arrange entrance to provide visual privacy.

2-5.8.2.1 Function: Restrooms for male occupants.

2-5.8.2.2 Adjacency requirements: Adjacent to corridor.

2-5.8.2.3 Furnishings/Fixtures/Equipment: Provide 2 lavatories, 3 floor mounted toilets, and 2 wall-hung urinals. Lavatories shall be countertop mounted. Countertops shall be plastic laminate or solid surfacing material. Provide toilet partitions at each toilet, and urinal partitions between urinals. Provide the following toilet accessories: one continuous mirror full width of countertop at countertop mounted lavatories; one paper towel dispenser/waste receptacle per toilet room; one soap dispenser per lavatory; one toilet tissue dispenser per toilet; one robe hook on each toilet partition door.

2-5.8.2.4 Minimum Finishes:
Floor: porcelain tile, or ceramic tile.
Base: porcelain tile, or ceramic tile.
Walls: ceramic tile, or 1800 mm high ceramic tile wainscot with painted impact resistant gypsum wallboard or painted concrete masonry units above.
Ceiling: painted Portland cement plaster, or painted gypsum wallboard or veneer plaster.

2-5.8.2.5 Other requirements:

2-5.8.3 **Women's Toilet Room(s)**. Provide one room, sized to accommodate the number of plumbing fixtures required. Toilet rooms will be accessed from corridors. Arrange entrance to provide visual privacy.

2-5.8.3.1 Function: Restrooms for female occupants.

2-5.8.3.2 Adjacency requirements: Adjacent to corridor.

2-5.8.3.3 Furnishings/Fixtures/Equipment: Provide 3 lavatories and 3 floor mounted toilets Lavatories shall be countertop mounted. Countertops shall be plastic laminate or solid surfacing material. Provide toilet partitions at each toilet. Provide the following toilet accessories: one continuous mirror full width of countertop; one paper towel dispenser/waste receptacle per toilet room; one soap dispenser per lavatory; one toilet tissue dispenser per toilet; one sanitary napkin disposal at each toilet; one robe hook on each toilet partition door.

2-5.8.3.4 Minimum Finishes:
Floor: porcelain tile, or ceramic tile.
Base: porcelain tile, or ceramic tile.
Walls: ceramic tile, or 1800 mm high ceramic tile wainscot with painted impact resistant gypsum wallboard or painted concrete masonry units above.
Ceiling: painted Portland cement plaster, or painted gypsum wallboard or veneer plaster.

2-5.8.3.5 Other requirements:

2-5.8.4 **Shower Room**. Provide two. Rooms shall be used by able-bodied military personnel

only. Rooms shall be accessed from corridor. Showers shall not be combined with toilet rooms.

2-5.8.4.1 Function: Private shower and dressing room for use by brigade staff.

2-5.8.4.2 Adjacency requirements: Adjacent to corridor. Near toilets.

2-5.8.4.3 Furnishings/Fixtures/Equipment: Provide one ceramic tile shower with rod and shower curtain. Shower shall have ceramic soap holder and wall mounted grab bar. Dressing area shall have bench, four towel/robe hooks, and wall mounted full-length mirror. Provide floor drain at dressing area, locate outside of circulation path.

2-5.8.4.4 Minimum Finishes:
Floor: ceramic tile.
Base: ceramic tile.
Walls: ceramic tile
Ceiling: painted Portland cement plaster.

2-5.7.5.5 Other requirements:

2-5.8.5 **Janitor Closet**. Provide one. Minimum area: 2.3 m^2 [25 sf]. Room shall be accessed from corridor.

2-5.8.5.1 Function: Sink and storage of cleaning supplies, soap, paper products.

2-5.8.5.2 Adjacency requirements: Near toilets and shower rooms.

2-5.8.5.3 Furnishings/Fixtures/Equipment: Provide one floor mounted mop sink, mop rack for two mops, and minimum 1500 linear mm of wall mounted stainless steel shelving.

2-5.8.5.4 Minimum Finishes:
Floor: ceramic tile, or sealed concrete
Base: resilient cove base, or ceramic tile base
Walls: painted water-resistant gypsum wallboard, or painted concrete masonry units
Ceiling: painted gypsum wallboard, painted veneer plaster, or painted Portland cement plaster

2-5.8.5.5 Other requirements: Door shall have classroom function (F84) lockset.

2-5.8.6 **Storage**. Provide minimum 4.6 m^2 [50sf] of general storage space. Storage room will be accessed from the corridor.

2-5.8.6.1 Function: Storage of [identify type of items to be stored] for the brigade.

2-5.8.6.2 Adjacency requirements: Adjacent to corridor/lobby

2-5.8.6.3 Furnishings/Fixtures/Equipment: [insert shelving requirement].

2-5.8.6.4 Minimum Finishes:
Floor: sealed concrete
Base: resilient cove base
Walls: painted gypsum wallboard or painted veneer plaster, or painted concrete masonry units
Ceiling: suspended acoustical panel ceiling

2-5.8.6.5 Other requirements: Door shall have storeroom function (F86) lockset.

2-5.9 **Battalion HQ Support Areas**. Provide the following areas in each battalion HQ building. Handicapped accessibility is not required in mechanical rooms, electrical and communications closets. All other support spaces shall be handicap accessible.

2-5.9.1 **Mechanical Room(s)**. Provide dedicated areas for mechanical equipment. Mechanical rooms shall not be used for storage or other purposes. Access will be limited to authorized personnel. Size and locate room(s) to allow equipment removal and maintenance. Provide floor openings and vertical shaft spaces as necessary.

2-5.9.1.1 Function: Spaces for HVAC, water heating, and other plumbing and mechanical equipment.

2-5.9.1.2 Adjacency requirements: Locate to allow efficient distribution. Mechanical rooms shall have doors opening to the exterior.

2-5.9.1.3 Furnishings/Fixtures/Equipment: As required by Statement of Work.

2-5.9.1.4 Minimum Finishes:
Floor: sealed concrete
Base: resilient cove base, or none.
Walls: painted gypsum wallboard or painted veneer plaster, or painted concrete masonry units
Ceiling: none required

2-5.9.1.5 Other requirements: Doors shall have storeroom function (F86) locksets.

2-5.9.2 **Electrical Room(s)**. Provide dedicated areas for electrical equipment. Electrical rooms shall not be used for storage or other purposes. Access will be limited to authorized personnel. Size and locate room(s) to allow equipment removal and maintenance.

2-5.9.2.1 Function: Spaces for electrical equipment.

2-5.9.2.2 Adjacency requirements: Locate to allow efficient distribution. Electrical rooms shall be accessed from the exterior or from corridors.

2-5.9.2.3 Furnishings/Fixtures/Equipment: As required by Statement of Work.

2-5.9.2.4 Minimum Finishes:
Floor: sealed concrete
Base: resilient cove base
Walls: painted gypsum wallboard or painted veneer plaster, or painted concrete masonry units
Ceiling: none required.

2-5.9.2.5 Other requirements: Electrical service to buildings shall be underground. Doors shall have storeroom function (F86) locksets.

2-5.9.3 **Communication Room**. Provide dedicated room(s) for communication distribution equipment. Each room shall be dedicated to communications equipment, and shall not be combined with mechanical or electrical rooms. Provide one main communication room;

minimum size 3000 mm [10'-0"] x 3300 mm [11'-0"]. In two-story buildings, the communication room shall be located on the second floor. Provide additional communication rooms as needed; all spaces having telephone or computer data outlets shall be located to allow a maximum cable length of 90 m [295 feet] between outlet and communication room. Minimum dimensions of secondary communication rooms shall be 2100 mm [7;-0"] x 3000 mm [10'-0"]. Provide floor openings and vertical shaft spaces as necessary. Rooms shall be accessed from corridors. Access will be limited to authorized personnel.

2-5.9.3.1 Function: Distribution areas for telephone, data network, and cable television.

2-5.9.3.2 Adjacency requirements: Adjacent to corridor. Locate to allow efficient distribution.

2-5.9.3.3 Furnishings/Fixtures/Equipment: As required by Statement of Work.

2-5.9.3.4 Minimum Finishes:
Floor: vinyl composition tile
Base: resilient cove base
Walls: painted gypsum wallboard or painted veneer plaster, or painted concrete masonry units
Ceiling: painted gypsum wallboard, painted veneer plaster, or suspended acoustical panel ceiling

2-5.9.3.5 Other requirements: Provide minimum 900 mm [3'-0"] wide door with storeroom function (F86) lockset.

CHAPTER 3

SITE PLANNING AND DESIGN

3-1 **SCOPE OF WORK.** This project consists of constructing [Insert No. Of Units] [Unaccompanied Enlisted Personnel Housing (UEPH) Units] [Company Operations Facilities (COF)] [Battalion and Brigade Headquarters Facilities]. Imaginative site design is encouraged, however, the site boundaries and project composition are fixed. Based on the graphic and narrative description[s] of site opportunities and constraints provided, the offeror shall verify that the site meets the program requirements.

3-2 **SITE VERIFICATION.** Graphic and narrative descriptions of site opportunities and constraints have been provided. [Insert a description of information being provided or made available to the offerors, and the process to obtain the information. Address offeror access to base maps, as-built documents of existing facilities, points of contact with private, public and Government utilities, and related materials.] Each offeror shall verify that the site meets the program requirements. [Obtain the site analysis and the documented site opportunities and constraints to verify that the site meets the [Unaccompanied Enlisted Personnel Housing (UEPH) Units] [Company Operations Facilities (COF)] [Battalion and Brigade Headquarters Facilities] requirements that are provided. The site analysis can be obtained from [insert appropriate individual].] [No site analysis has been provided. The offeror shall perform a detailed site analysis to verify that the site meets the [Unaccompanied Enlisted Personnel Housing (UEPH) Units] [Company Operations Facilities (COF)] [Battalion and Brigade Headquarters Facilities] requirements that are provided.] [The analysis results [are] [shall be] documented in a written and graphic summary of site opportunities and constraints for [Unaccompanied Enlisted Personnel Housing (UEPH) Units] [Company Operations Facilities (COF)] [Battalion and Brigade Headquarters Facilities]]. If the site is found to be unsuitable by an offeror, [insert appropriate action to be taken by offeror (i.e. suggest alternate available site, possible site remediation, etc].

3-3 **EXISTING CONDITIONS.** The offeror shall be provided with a [digital] [hard copy] topographic survey for this site by the Government. It is the offeror's responsibility to verify the Government-furnished survey and obtain all additional survey information that may be required for a completed design and construction project. Any discrepancies which are found in the Government furnished survey shall be brought to the immediate attention of the Contracting Officer for clarification.

3-3.1 **Station Maps.** Maps of the existing utility distribution systems including commercially owned utilities (i.e.: telephone, cable television, gas, etc.) may be obtained from the [Public Works Department] [Insert appropriate office] at the installation. [Insert other relevant information such as points of contact, restrictions on access to certain areas, hours of operation, phone and fax numbers, etc.] The locations of existing utilities shown on the site survey and utility maps are approximate only. The offeror shall scan the construction site with electromagnetic or sonic equipment and mark the surface of the ground where existing underground utilities are discovered. Immediately contact the [Contracting Officer] if actual conditions vary from the topographic survey.

3-4 **EXCAVATION PERMITS.** The contractor shall obtain approved station excavation permits prior to digging. Request for excavation permits shall be in accordance with installation policies. [List additional requirements for contacting local utility companies prior to performing excavations.] [Delete this wording and insert "Not required." if the activity does not require excavation permits.]

3-5 **SITE DEVELOPMENT PLAN.** Provide a site development plan that shows the spatial and functional arrangement of all [Unaccompanied Enlisted Personnel Housing (UEPH) Units] [Company Operations Facilities (COF)] [Battalion and Brigade Headquarters Facilities] requirements. The plan should ensure an economical, compatible and functional land use development that utilizes the advantages of the site, fosters visual order, [Insert "and provides a sense of community" when constructing UEPH Units]**.** The site development plan shows consideration for the site opportunities and constraints, program requirements, and specific site design criteria and guidance provided. [The installation shall provide the contractor a copy of the recommendations of the Installation Real Property Master Plan and the Installation Design Guide. These recommendations should be addressed.]

3-5.1 **Land Use.** The plan for the area should reflect an optimum balance of floor area, open space, and pedestrian and vehicular circulation. The plan should show an efficient, organized and economical land use arrangement that is compatible and functional. This plan should show the relationship of the area to adjacent land uses. [Insert specific installation criteria].

[3-5.2 **Noise Mitigation.** Insert specific installation requirements.]

3-5.3 **Buffer Area.** Provide appropriate buffer areas to separate and visually isolate the [Unaccompanied Enlisted Personnel Housing (UEPH) Units]] [Company Operations Facilities (COF)] [Battalion and Brigade Headquarters Facilities] from [Insert specific installation criteria]. [Note that greater emphasis should be used to foster a sense of community within the UEPH Complex, while separating the "work" areas from the "home" areas to the greatest extent possible.]

[3-5.4 **Orientation.** Orient the Unaccompanied Enlisted Personnel Housing (UEPH) to the maximum extent possible within the constraints of the site available to facilitate pedestrian traffic within the complex. Orientation shall be functional, and encourage unit cohesion. [Insert additional orientation requirements that are dependent upon known site constraints.] Additionally, solar orientation should be considered so that the long axis of the building is within 20 degrees east or west of true South, so that a major section of the roof faces within 20 degrees of South. The purpose of solar orientation is to expose a minimum surface area to direct solar gain while allowing the units the potential for passive solar applications. Additional consideration will be given during the quality evaluations with respect to unit orientations and passive solar applications considered and included. For additional passive solar information and considerations, see chapter 11 of this Statement of Work.] [Edit if necessary where known site constraints preclude compliance with this requirement.] [Insert Installation Criteria.]

[3-5.5 **Orientation.** Orient the Company Operations Facilities (COF) to the maximum extent possible within the constraints of the site available to facilitate pedestrian traffic within the complex. Orientation shall be functional, and encourage unit cohesion. [Insert additional orientation requirements that are dependent upon known site constraints.] Additionally, solar orientation should be considered so that the long axis of the building is within 20 degrees east or west of true South, so that a major section of the roof faces within 20 degrees of South. The purpose of solar orientation is to expose a minimum surface area to direct solar gain while allowing the units the potential for passive solar applications. Additional consideration will be given during the quality evaluations with respect to unit orientations and passive solar applications considered and included. For additional passive solar information and considerations, see chapter 11 of this Statement of Work.] [Edit if necessary where known site constraints preclude compliance with this requirement.] [Insert Installation Criteria.]

[3-5.6 **Orientation.** Orient the Battalion and Brigade Headquarters Facilities to the maximum

extent possible within the constraints of the site available to facilitate pedestrian traffic within the complex. Orientation shall be functional, and encourage unit cohesion. [Insert additional orientation requirements that are dependent upon known site constraints.] Additionally, solar orientation should be considered so that the long axis of the building is within 20 degrees east or west of true South, so that a major section of the roof faces within 20 degrees of South. The purpose of solar orientation is to expose a minimum surface area to direct solar gain while allowing the units the potential for passive solar applications. Additional consideration will be given during the quality evaluations with respect to unit orientations and passive solar applications considered and included. For additional passive solar information and considerations, see chapter 11 of this Statement of Work.] [Edit if necessary where known site constraints preclude compliance with this requirement.] [Insert Installation Criteria.]

3-6 **GRADING AND DRAINAGE.** The grading should maintain existing topography while recognizing standard gradients. There should be a balance of the quantity of cut and fill soils which would create a smooth transition of graded areas into the existing natural site. The plan should reflect selective site clearing that preserves groups of trees. Grading should manage site runoff to maintain rate of flow and quantity to pre-construction levels, or reduce site runoff where possible. The principles of positive drainage should be applied to control the conditions that remove rainfall away from facilities and functions. Site designs should seek to minimize the disturbance of land, and utilize natural drainage paths where possible. Federal, State and local regulations regarding the design of stormwater management systems shall be considered the minimum design criteria. [Insert additional installation requirements for grading and drainage.] [Address [NPDES] permits required for construction activities.] Additionally, minimize the impact of construction activities on drainage and prevent loss of soils by water and wind erosion. Designs which improve on existing water quality by incorporating sustainable design principles are encouraged, consistent with budget constraints and activity requirements.

3-7 **GENERAL SITE DESIGN CRITERIA.** The following are to be used as guidance for site design. Minimum spacing between buildings shall be [Insert Installation Minimum Setback Requirements]. Analyze the existing site conditions (i.e.; land use, community facilities, off-site workplaces, etc.) and incorporate a site design that results in an aesthetically pleasing and functional design. The site design shall address the following: orientation, site organization, spatial balance, character and scale, compatibility, life safety, circulation systems, view of the site, buffer zones, wind and noise control, land forms (i.e.; mounds, swales, ponds, etc.), lawns and shaded areas, vehicular access, a minimum of [Insert the Minimum Spaces Required by the Installation] parking spaces for staff, residents, handicapped, visitors, service, and motorcycles, service entrances, bus routes, connecting walks, utility corridors, fire protection access, site lighting, site furnishings, mechanical enclosures, trash collection dumpsters with trash enclosures, landscaping, and etc. [Dining facilities are to be located within walking distance to the UEPH Complex, and constructed by separate contract.] [Insert exact location and size of existing or future dining facility in the RFP.] [For future expansion, a minimum grass area of [Insert Installation Required Square Footage] square feet located [Insert Location of Future Expansion] shall be provided. No new improvements shall be constructed within the area designated for future expansion.]

[3-7.1 **Site Design Criteria For UEPH Facilities.** In addition to the general site design criteria defined above, UEPH Facilities shall include the following: a grass multi-purpose area having a minimum of [Insert Installation Required Area], a grass playing field area having a minimum of [Insert Installation Required Area], [Insert required number and size of multipurpose courts] paved multipurpose courts, and a grass training area having a minimum of [Insert Installation Required Area]. [Insert additional installation requirements such as baseball diamonds and bleachers, etc.]

[3-7.2 **Site Design Criteria for Company Operations Facilities.** In addition to the general site design criteria defined above, Company Operations Facilities shall include the following: [Insert specific installation requirements with minimum required area].

[3-7.3 **Site Design Criteria for Battalion and Brigade Headquarter Facilities.** In addition to the general site design criteria defined above, Battalion and Brigade Headquarter Facilities shall include the following: a grass parade/viewing ground having a minimum of [Insert Installation Required Area][; Insert specific installation requirements with minimum required area].

3-8 **CIRCULATION AND PARKING.** The vehicular and pedestrian circulation system shall promote safe, efficient movement of vehicles and pedestrians within the site area. Site design shall facilitate pedestrian traffic between facilities, and minimize the need for vehicular traffic within the complex. Vehicular traffic shall be routed around the outer perimeter of UEPH facility areas to the greatest extent possible. The vehicular and pedestrian circulation system should maintain the maximum separation of vehicles and pedestrians. Safe circulation systems have a clear hierarchy of movement, lead to a clear destination, and do not interrupt other functions. The following criteria shall be considered for designing streets and drives for vehicles and pedestrians:

3-8.1 **Vehicular Circulation.** Vehicular circulation layout is determined by applying the design vehicle templates to the site design. The passenger car class includes passenger cars and light delivery trucks, such as vans and pick-ups. The passenger car template is equivalent to the non-organizational - privately owned vehicle (POV). The truck class template includes single-unit trucks, recreation vehicles, buses, truck tractor-semitrailer combinations, and trucks or truck tractors with semi-trailers in combination with full trailers. Templates showing the turning movements for design vehicles are provided by the American Association of State Highway and Transportation Officials (AASHTO). Obtain templates and utilize them during the design of the facility. Provide the vehicle clearances that are required to meet traffic safety for emergency vehicles, service vehicles, and moving vans. Site entrances and site drive aisles shall include required traffic control signage. Maximize spacing between drives, incorporate right-angle turns, and limit the points of conflicts between traffic.

3-9 **DEFINITIONS.**

3-9.1 **Entrance and Intersection Design.** For site entrances and drive aisle intersections, provide "T" intersection offsets of at least 38.1 m [125 ft]. The preferred angle of intersection is right-angle (90 degrees).

3-9.2 **Drive Aisle Design.** The selected design vehicle templates determine dimensions for drive aisles for parking lots. Separation, corner clearances, and sight distance are established when the design vehicle templates and speed limits are selected. Design pavements for the wheel load associated with the design vehicle. Concrete entrances shall be provided at intersections with installation roads.

3-9.3 **Privately Owned Vehicle (POV) Parking.** POV stalls without vehicle overhang shall be a 2.7 m x 5.5 m [9 ft x 18 ft]. The design vehicle template that is used to design this space shall be described.

3-9.4 **Pedestrian Circulation.** Pedestrian circulation should be safe and separate from vehicle circulation. Provide good sidewalk layout to connect all building entrances with parking and

site facilities and existing walks. Pedestrian circulation should be based on pedestrian desired lines of walking between site facilities and existing walks. Desired lines should be weighted to predict the most traveled routes. These routes would require paving. Topography and vegetation can be used to reinforce a sense of movement. Design pedestrian concentration areas with adequate paved area.

3-10 **SIDEWALK DESIGN.** The network of walks throughout the complex shall be designed to facilitate pedestrian traffic among facilities, and minimize the need to use vehicles. Sidewalks shall be provided on both sides of the street. Walks shall be a minimum of 1.2 m [4 ft] wide exclusive of curb width, and made [non-reinforced][wire mesh reinforced] concrete with a minimum thickness of 100 mm [4 in]. Where walks are adjacent to the curb, the curb width is not to be included as sidewalk. Ramps for handicapped individuals shall be provided at intersections by depressing street curbs and adjacent sidewalk.

3-11 **LANDSCAPE PLANTING PLAN.** [Insert the requirements of the activity department in charge of landscaping criteria]. Landscaping shall be in accordance with [Insert activity criteria governing landscaping]. [A plant list of allowable plants has been attached for the contractor's use]. The offeror shall obtain and use the services of a qualified [State certified] landscape architect, experienced in site planning and planting design. A complete, integrated landscape-planting plan shall be provided for the overall project. The design shall reflect appropriate groupings, foundation plantings, and street tree plantings to define the open spaces to ensure a complete landscaped project. Choose plant materials on the basis of plant hardiness, climate, soil conditions, low maintenance, and quality. Selected plant materials shall be easily maintained and tolerant of the specific site conditions. Incorporate sustainable design principles into the selection of plants. Planting or seeding shall occur only during periods when beneficial results can be obtained.

3-11.1 **Trees, Shrubs, and Ground Cover.** Plant varieties shall be nursery grown or plantation grown stock. They shall be grown under climatic conditions similar to those in the locality of the project.

3-11.1.1 **Quality.** Well-shaped, well-grown, vigorous, healthy plants having healthy and well-branched root systems shall be provided. Plants shall be free from disease, harmful insects and insect eggs, sunscald injury, disfigurement, and abrasion. Plants shall be provided that are typical of the species or variety.

3-11.1.1.1 **Shade and Flowering Trees.** A height relationship to caliper shall be provided. Height of branching should bear a relationship to the size and variety of tree specified, and with the crown in good balance with the trunk. Trees shall not be "poled" or the leader removed.

3-11.1.1.1.1 **Single Stem.** Trunk shall be reasonably straight and symmetrical with crown and have a persistent main leader.

3-11.1.1.1.2 **Multi-Stem.** All countable stems, in aggregate, shall average the size specified. To be considered a stem, there should be no division of the trunk, which branches more than 150 mm [6 in] from the ground level.

3-11.1.1.1.3 **Specimen.** A plant shall be provided that is well branched and pruned naturally according to the species. The form of growth desired, which may not be in accordance with natural growth habit, shall be as indicated.

3-11.1.1.2 **Deciduous Shrub.** Plants shall be provided having the height and number of

primary stems as recommended by the agency having jurisdiction. An acceptable plant shall be well shaped with sufficient well-spaced side branches recognized by the trade as typical for the variety grown in the region.

3-11.1.1.3 **Coniferous Evergreen.** Provide the height-to-spread ratio as recommended by the agency having jurisdiction. Trees shall not be "poled" or the leader removed. An acceptable plant shall be exceptionally heavy, well shaped and trimmed to form a symmetrical and tightly knit plant. The form of growth desired shall be as indicated.

3-11.1.1.4 **Broadleaf Evergreen.** Provide the ratio of height-to-spread as recommended by the agency having jurisdiction. An acceptable plant shall be well shaped and recognized by the trade as typical for the variety grown in the region.

3-11.1.1.5 **Ground Cover.** Plants shall be provided with the minimum number of runners and length of runner as recommended by the agency having jurisdiction. Plants shall be furnished that have heavy, well developed, and balanced top with vigorous well developed root system, and shall be furnished in containers.

3-11.1.2 **Measurement.** Plant measurements shall be in accordance with the agency having jurisdiction.

3-11.1.3 **Percolation Test.** Test for percolation shall be done to determine positive drainage of plant pits and beds. All soil and drainage conditions detrimental to the growth of plant material shall be identified and a proposal correcting the conditions shall be submitted.

3-11.1.4 **Soil Test.** A soil test shall be performed for pH, chemical analysis, and mechanical analysis to establish the quantities and type of soil amendments required to meet local growing conditions for the type and variety of plant material specified.

3-11.1.5 **Installation.** Verify the location of underground utilities. When obstructions below ground or poor drainage affect the planting operation, proposed adjustments to plant location, type of plant, and planting method or drainage correction shall be submitted. The plant material shall be installed during appropriate planting times and conditions recommended by the trade for the type and variety of plant material specified. Plant pits shall be excavated and backfilled as recommended by the agency having jurisdiction. The planting operation shall be performed only during periods when beneficial results can be obtained. When special conditions warrant a variance to the planting operations, proposed planting times should be submitted.

3-11.1.6 **Pruning.** The total amount of foliage shall be pruned by one-fourth to one-third on installed trees and shrubs to compensate for loss of roots and transplanting shock. The typical growth habit of individual plants shall be retained. Trees shall not be poled or the leader removed, nor shall the leader be pruned or "topped off."

3-11.1.7 **Maintenance During Planting Operation.** Installed plants shall be maintained in a healthy growing condition. Maintenance operations shall begin immediately after each plant is installed and shall continue until the plant establishment period commences.

3-11.1.8 **Plant Establishment Period.** On completion of the last day of the planting operation, the plant establishment period for maintaining installed plants in a healthy growing condition shall commence and shall be in effect for the remaining contract time period not to exceed 12 months. When the planting operation extends over more than one season or there is a variance to the

planting times, the plant establishment periods shall be established for the work completed.

3-11.1.9 **Maintenance During Establishment Period.** The maintenance of plants shall include straightening plants, tightening stakes and guying material, repairing tree wrap, protecting plant areas from erosion, maintaining erosion material, supplementing mulch, accomplishing wound dressing, removing dead or broken tip growth by pruning, maintaining edging of beds, checking for girdling of plants and maintaining plant labels, watering, weeding, removing and replacing unhealthy plants.

3-11.1.10 **Unhealthy Plant.** A plant shall be considered unhealthy or dead when the main leader has died back, or 25 percent of the crown is dead. Determine the cause for an unhealthy plant. Unhealthy or dead plants shall be removed immediately and shall be replaced as soon as seasonal conditions permit in accordance with the following warranty paragraph.

3-11.1.11 **Warranty.** Furnished plant material shall be guaranteed to be in a vigorous growing condition for a period of 12 months regardless of the contract time period. A plant shall be replaced one time under this guarantee. Transplanting existing plants requires no guarantee.

3.11.2 **Turf.** Turf consists of seed, sod, and sprigs.

3.11.2.1 **Seed.** State approved seed of the latest season's crop shall be provided in the original sealed packages bearing the producer's guaranteed analysis for percentages of mixture, purity, germination, hard seed, weed seed content, and inert material. Labels shall be in conformance with applicable State seed laws. Seed mixtures shall be proportioned by weight. Weed seed shall not exceed one percent by weight of the total mixture.

3-11.2.2 **Sod.** State approved sod shall be provided as classified by applicable State laws. Each individual sod section shall be of a size to permit rolling and lifting without breaking. The sod shall be relatively free of thatch, diseases, nematodes, soil-borne insects, weeds or undesirable plants, stones larger than 50mm[2 in] in any dimension, woody plant roots, and other material detrimental to a healthy stand of turf. Sod that has become dry, moldy, or yellow from heating, or has irregular shaped pieces of sod and torn or uneven ends shall be rejected. Sod shall be machine cut to a uniform thickness of 32 mm[1-1/4 in] within a tolerance of 6 mm[1/4 inch] excluding top growth and thatch. Measurement for thickness shall exclude top growth and thatch. The limitation of time between harvesting and placing sod shall be 36 hours.

3-11.2.3 **Sprig Quality.** The cultivar shall be provided as healthy living stems, stolons, or rhizomes with attached roots, including two or three nodes, and shall be from 100 to 150 mm[4 to 6 in] long, without adhering soil. Sprigs shall be provided which have been grown under climatic conditions similar to those in the locality of the project. Sprigs shall be obtained from heavy and dense sod, free from weeds or other material detrimental to a healthy stand of turf. Sprigs that have been exposed to heat or excessive drying shall be rejected. The time limitation between harvesting and placing sprigs shall be 24 hours.

3-11.2.4 **Soil Test.** A soil test shall be performed for pH, chemical analysis, and mechanical analysis to establish the quantities and type of soil amendments required to meet local growing conditions for the type and variety of turf specified.

3-11.2.5 **Temporary Turf Cover.** When there are contract delays in the turfing operation or a quick cover is required to prevent erosion, the areas designated for turf shall be seeded with a temporary seed. When no other turfing materials have been applied, the quantity of one-half of the

required soil amendments shall be applied and the area tilled.

3-11.2.6 **Final Turf.** The turf shall be installed during appropriate planting times and conditions recommended by the trade for the type and variety of turf specified. The turf operations shall be performed only during periods when beneficial results can be obtained. Drainage patterns shall be maintained. The turf shall be installed by using the methods as recommended by the trade for the type and variety of turf specified. Immediately after turfing, the area shall be protected against traffic or other use by erecting barricades and providing signage as required. The turf establishment period for establishing a healthy stand of turf shall begin on the first day of work under the turfing contract and shall end three months after the last day of the turfing operation. An unsatisfactory stand of turf shall be repaired as soon as turfing conditions permit.

3-11.2.7 **Satisfactory Stand of Turf.**

3-11.2.7.1 **Seeded Lawn Area.** A satisfactory stand of turf from the seeding operation for a lawn area is defined as a minimum of 160 grass plants per square meter [15 grass plants per square foot]. Bare spots shall be no larger than 150 mm [6 in] square. The total bare spots shall not exceed two (2) percent of the total seeded area.

3-11.2.7.2 **Seeded Field Area.** A satisfactory stand of turf from the seeding operation for a field area is defined as a minimum of 100 grass plants per square meter [10 grass plants per square foot]. The total bare spots shall not exceed two (2) percent of the total seeded area.

3-11.2.7.3 **Sodded Area.** A satisfactory stand of turf from the sodding operation is defined as living sod uniform in color and texture. Bare spots shall be no larger than
50 mm[2 in] square.

3-11.2.7.4 **Sprigged Area.** A satisfactory stand of turf from the sprigging operation is defined as a minimum of 20 sprigs per square meter [2 sprigs per square foot]. Bare spots shall be no larger than 225 mm [9 in] square. The total bare spots shall not exceed two (2) percent of the total sprigged area.

3-11.2.8 **Maintenance During Establishment Period.** The maintenance of the turfed areas shall include eradicating weeds, eradicating insects and diseases, protecting embankments and ditches from erosion, maintaining erosion control materials and mulch, protecting turf areas from traffic, mowing, watering, post-fertilization, and replacing unsatisfactory turf areas.

3-12 **SPRINKLER AND/OR IRRIGATION SYSTEM.** [Insert installation standards for sprinkler and irrigation systems.] [Provide a complete permanent automatic irrigation system with controllers covering all common planting areas and slopes. Design the system to function with available water pressure. Investigate and employ methods of irrigation based on sustainable design principles, where practical and feasible.] [In areas where sprinkler and/or irrigation systems are not required, delete the paragraph text and insert, “Not required”]

CHAPTER 4

SITE ENGINEERING

4-1 SOILS.

4-1.1 **Soil and Foundation Report (Geotechnical Report).** A preliminary Soil and Foundation Report is provided as part of this RFP. A drawing indicating Subsurface Explorations and Geologic Profiles for the proposed site is also provided. The report provides an overview of soils and geologic conditions, and is furnished for informational purposes only. The offeror to whom this contract is awarded shall, with his or her consulting professional geotechnical engineer, be responsible for determining site specific geotechnical conditions. The Contractor provided site specific geotechnical conditions report shall include, but not be limited to: Classification of soil and rock; Depth to bedrock; Extent of boulders; Bearing capacity of soil and rock; Settlement potential; Compaction requirements; Groundwater characteristics; Infiltration and permeability; Erosion and siltation; Surface and subsurface drainage; Soil resistivity; [Insert any site specific requirements.]

4-1.1.1 **Certification.** The offeror and his or her professional geotechnical engineer consultant shall certify in writing that the design of the project has been developed consistent with the site specific geotechnical conditions. The certification shall be stamped by the consulting professional geotechnical engineer and shall be submitted with the 50 percent design submission. If revisions are made to the 50 percent design submission, a new certification shall be provided with the final design submission.

4-1.2 **Soil Compaction.** Soil compaction shall be achieved by equipment approved by a professional geotechnical engineer. Material shall be moistened or aerated as necessary to provide the moisture content that will readily facilitate obtaining the compaction specified with the equipment used. Compact each layer to not less than the percentage of maximum density specified in Table 4-1, determined in accordance with ASTM D 1557, Method D.

TABLE 4-1 Soil Compaction

Subgrade Preparation, Fills, Embankments, and Backfills	Compaction Requirements (Percentage of Maximum Density)
Structures & Building Slabs	90
Streets, Paved Areas, Bike Paths	90
Sidewalks	85
Grassed Areas	80

The requirements shall be verified or modifications recommended by the consulting professional geotechnical engineer in the report wherever engineering, soils, or climatic factors indicate the necessity. Any modification to the stated compaction requirements shall require the approval of the Contracting Officer.

4-1.3 **Capillary Water Barrier.** A capillary water barrier is required for all interior slabs on grade, including garages, carports and storage rooms. As a minimum, the capillary water barrier shall [Define minimum requirements.]

4-1.4 **Soil Treatment.** [If not required insert "...(DELETED)." and delete remainder of text.] Soil treatment for termites shall be by the chemical method. Methods and extent of protection required are as follows: [Insert project specific requirements.]

4-1.5 **Decay Treatment.** Decay treatment shall apply to the following: [Insert project specific requirements.]

4-1.6 **Radon Mitigation.** The design and construction of foundation walls, slabs, and crawl spaces shall include provisions for the reduction of radon entry and facilitate its removal. Radon mitigation shall comply with the requirements of ASTM E1465. [If not required, insert "...Deleted"." and delete remainder of text. Design District technical specialists can contact Mr. David Price of EPA's Indoor Environments Division, 202-564-9447 regarding suggested language concerning indoor air quality and radon mitigation].

4-2 **EROSION AND SEDIMENT CONTROL.** Erosion and Sediment Control Facilities shall be required in accordance with [Insert state or local agency having jurisdiction and reference any applicable manual(s)], as specified in the manual entitled [insert criteria manual title].

4-3 **DEMOLITION.** Existing facilities scheduled for demolition includes [insert description or reference attached sketches]. [The following demolished materials shall [become][remain] the property of the [Contractor][Government: include installation list of recycled materials], unless otherwise indicated or specified.] Materials not owned by the Government and not used in construction shall be disposed of [off][on] government property. Obtain required demolition permits [and disposal permits] from [Insert appropriate agency having jurisdiction and reference any applicable manual(s)]. Obtain approval of the disposal site from the contracting officer[and submit haul tickets for material disposed of off of Government property].

4-4 **CLEARING AND GRUBBING.** Clear and grub all trees and vegetation necessary for construction; but, save as many trees as possible. [All timber removed from the project site shall [become][remain] the property of the [Contractor] [Government], unless otherwise indicated or specified.] [For all timber the Government desires to have ownership of, insert installation requirements for minimum size, delimbing, delivering, stacking, stump removal, and any requirements associated with chipping wastes (mulch).] [The contractor shall reimburse the Government for the value of the timber. The contractor shall submit payment to the Contracting Officer by cashier's or certified check in the amount of [__], made payable to the U.S. Treasury. Payment shall be made within thirty (30) days of the Notice To Proceed. The contracting Officer will forward the check to [Insert appropriate office.]

[4-5 **WETLANDS.** Jurisdictional [tidal][and][non-tidal] wetlands [have][have not] been identified on the project site. [The following mitigation shall be incorporated into the design: [__].] [Determination has been made that jurisdictional wetlands are not on the site.]]

4-6 **EARTHWORK.** The contractor is responsible for obtaining subsurface soil information for design purposes.

4-7 **BORROW MATERIAL.** Obtain borrow material required for construction from sources [off][on] government property. [Insert specific criteria regarding Government owned borrow sources, borrow site testing and acceptance, and other related information.]

4-8 **WATER DISTRIBUTION SYSTEM.** The design of the water distribution system shall be in accordance with the [Insert agency having jurisdiction.] Where the requirements of the agency having jurisdiction and the requirements defined herein disagree, the more stringent shall apply. The contractor shall determine the domestic and the fire demands for the facilities and shall verify the design of all components of the domestic and fire protection supply systems. Design of a water distribution system requires both domestic and fire flow demands be considered concurrently.

4-8.1 **Analysis of Existing System Capacity.** [The contractor shall obtain all necessary static pressure, residual pressure, and flow characteristics of the existing distribution system by actual field tests.] [The installation shall insert existing fire hydrant flow test results when available.][The contractor shall provide design calculations that show the existing system is capable of handling the additional flows.][The installation shall state that the existing system is capable of handling the additional flows.]

4-8.2 **Connections to Water Mains and Building Service Lines.** [Insert installation specific connection location requirements.] [The contractor shall be responsible for the design of the sizes, locations, and means of connections to the existing system based on Facility requirements and system conditions. Establish the location for the connection based upon economics and site design parameters.]

4-8.2.1 **Connections to Water Mains.** Design the connections to the station water system including the meter assemblies and the necessary backflow-preventing devices. Fire protection system shall be considered as that part of the distribution system supplying fire hydrants, or fire hydrant laterals. Service connections supply water from the main to the building. Mains shall be looped with no dead ends and be of adequate size to satisfy both domestic and fire flow requirements. Minimum main size is 150 mm [6 in]. Sufficient sectional control valves shall be provided so that no more than two fire hydrants will be out of service in the event of a single break in a water main. A copper tracer wire shall be placed directly above all non-metallic mains when plastic marking tape does not provide means of determining alignment of pipe by metal detecting equipment. The pipe, valves, and all other materials shall meet the requirements of the [agency having authority] or [Insert the installation standards] for a 1034 kPa [150 psi] working pressure system. [Provide sacrificial anodes for all valves and metal pipe.]

4-8.2.2 **Building Connections.** Design and construction shall be in accordance with the International Building Code [2000 or latest edition].

4-8.3 **Trenches.** Water and gas mains [may] [may not] be installed in the same trench. [Determine if the local gas utility supplier will allow installation in the same trench and incorporate the standards of the gas utility supplier.] Water mains shall have a minimum earth cover of 750 mm [30 in] [as specified by the agency having jurisdiction] or [Insert the installation minimum cover]. Adequate cover must be provided for freeze protection. Where frost penetrates to a depth greater than the minimum above, greater cover will be required. Sufficient cover must also be provided to protect the pipe against structural damage due to superimposed surface loads. Lines installed with less cover than the minimums stated shall be concrete encased with a minimum concrete thickness of 150 mm [6 in].

4-8.4 **Fire hydrants.** Hydrants and valves shall conform to [the requirements of the agency having jurisdiction] or [Insert the installation's base hydrant standard]. Fire hydrants shall be

compatible with those presently in use at the installation [or by local Governments], with similar pump and hose connections. The maximum amount of flow that can be permitted shall be determined. Fire hydrant spacing shall be no greater that 150 m [500 ft] apart by paved road. In addition, a hydrant shall be provided so that all parts of the facilities can be reached by hose lines not over 105 m [350 ft] long. All distances shall be calculated along the closest route that the fire apparatus must travel (i.e.; along the curb or access lane). Each hydrant may account for a maximum of 95 liters per second [1500 gpm] of fire protection regardless of existing pressures or water line capacity. A fire hydrant shall be located within 15m [50 ft] from any fire department connection provided. Hydrant laterals shall be 150 mm [6 in] minimum size, and shall not exceed 15 m [50 ft] in length, and shall have an underground shutoff valve. Valve box, at each lateral, shall be located within 3 m [10 ft] of the hydrant, and shall not be located where obstructed by parked vehicles, shrubbery, etc. Guard post barriers shall be provided where hydrant locations are subject to vehicle damage.

4-8.5 **Shutoff Valve.** Each building shall be provided with a separate service and main shutoff valve, readily accessible to maintenance and emergency personnel. Shutoff valves in walks are prohibited.

4-8.6 **Metering.** [Insert the installation metering requirements] [Meters shall be equipped with electronic or radio frequency transmitters for remote monitoring. The method of remote monitoring must be coordinated with installation utility systems.]

4-8.7 **Materials.** Materials for the water distribution system shall be in accordance with the [agency having jurisdiction] [Insert installation standards]. Copper water service lines will be dielectrically isolated from ferrous pipe. Dielectric isolation shall conform to the requirements of [insert the agency having jurisdiction]. For ductile iron piping systems (except for ductile iron piping under floor in soil) conduct an analysis to determine if cathodic protection and/or bonded or unbonded coatings are required. Unbonded coatings shall conform to the requirements of the agency having jurisdiction.

4-8.8 **Economic Analysis.** Conduct an economic analysis to determine if cathodic protection and protective coatings should be provided for the following structures in soil resistivity conditions above 10,000 Ohm-cm: ferrous metallic potable water lines; Concentric neutral cable; Other buried and submerged ferrous metallic structures not covered above; Ferrous metallic piping passing through concrete shall not be in contact with the concrete.

4-8.9 **Field Quality Control for Water Distribution.** The [contracting officer] [Insert the appropriate person] will conduct field inspections and witness field tests specified. The contractor shall perform field tests, and provide labor, equipment, and incidentals required for testing, [except that water needed for field tests will be furnished as set forth in [Insert appropriate document]]. [Water needed for field tests will not be furnished by the government]. Do not begin testing on any section of a pipeline where concrete thrust blocks have been provided until at least 5 days after placing of the concrete. Testing procedures and requirements shall comply with the [requirements of the agency having jurisdiction.] [Insert the installation testing standards].

4-9 **SANITARY SEWERAGE SYSTEM.** The design of the sanitary sewer distribution system shall be in accordance with the [Insert State or local agency having jurisdiction.] Where the requirements of the agency having jurisdiction and the requirements defined herein disagree, the more stringent shall apply. The contractor shall determine the sewerage contribution for the facilities and shall verify the design of all components of the sanitary sewer system.

4-9.1 **Analysis of Existing System Capacity.** [The contractor shall provide design calculations that show the existing system is capable of handling the additional flows.] [The Installation shall state that the existing system is capable of handling the additional flows.]

4-9.2 **Calculate Sewage Contribution.** Calculate the sewage contribution from the new facilities in accordance with the [Insert State or local agency having jurisdiction.] [Insert installation standards for sewage contribution].

4-9.3 **Connections to Sewage Collection Mains and Building Service Lines.** [The installation shall insert specific connection location requirements.] [The contractor shall be responsible for the design of the sizes, locations, and means of connections to the existing system based on Facility requirements and system conditions. Establish the location for the connection based upon economics and site design parameters.] Connect to gravity mains with a manhole.

4-9.3.1 **Building Sewer Laterals and Connections.** Laterals and building connections shall be designed and constructed in accordance with the International Building Code [2000 or latest edition]. Minimum diameter for laterals shall be 150 mm [6 in] while maintaining a minimum velocity of 45 meters per minute [2.5 fps].

4-9.3.2 **Main Collection Trunks.** Pipe sizes and slopes shall be calculated using the Manning Formula. Manholes are required at all changes of direction and spaced not more than 122 m [400 ft] apart [or as required by installation]. Curved sewers are prohibited. Pipes shall be designed to flow full and maintain a minimum velocity of 45 meters per minute [2.5 fps]. If siphons are used, two lines of equivalent capacity shall be used with clean-outs.

4-9.4 **Trenches.** Sewer and water lines, mains or laterals, shall be placed in separate trenches. The separate trenches shall maintain a minimum lateral separation of 3m [10 ft].

4-9.5 **Minimum Sewer and Water Distribution Pipe Separation Requirements.** Parallel water and sewer pipe and crossings between water and sewer pipe shall be in accordance with the [state or local agency having jurisdiction] [Insert the installation standards].

4-9.6 **Cover.** Sewer lines shall be located at a depth greater than the frost penetration. Coordinate with building connection requirements. To prevent the pipe from being crushed by construction vehicles and the design vehicle, the minimum cover above the top of pipes shall be 750mm [30 in] unless pipe materials are used and/or unless the pipe is concrete encased with a minimum of 150 mm [6 in] thickness of concrete.

4-9.7 **Sewage Pump Station and Force Main.** Pump stations and force mains shall only be used when absolutely necessary. If required, pump stations and force mains shall be designed in accordance with the [agency having jurisdiction] [base standards]. [An on-site sewage lift station and force main shall not be required.] [An on-site sewage lift station and force main shall be required.] [The contractor shall determine if an on-site sewage lift station and force main is required and use only when required by the design or the existing system conditions.]

4-9.8 **Field Quality Control for Sanitary Sewer Distribution System.** The [contracting officer] [Insert the appropriate person] will conduct field inspections and witness field test specified. The contractor shall perform field tests, and provide labor, equipment, and incidentals required for testing, [except that water needed for field tests will be furnished as set forth in [Insert appropriate

document]]. [Water needed for field tests will not be furnished by the government]. For force mains, do not begin testing on any section of a pipeline where concrete thrust blocks have been provided until at least 5 days after placing of the concrete. Testing procedures and requirements shall comply with the [requirements of the agency having jurisdiction.][Insert the installation testing standards].

4-10 **STORMWATER MANAGEMENT SYSTEMS.** [Insert the agency having jurisdiction for storm water management and drainage system design.] The storm drainage system shall be properly coordinated with surrounding properties to ensure that runoff does not cause damage to other properties. All storm water management calculations shall be based upon a 10-year storm frequency. Design storm water management systems in accordance with the applicable requirements of "Controlling Urban Runoff: A Practical Manual for Planning and Designing Urban BMPS", by the Department of Environmental Programs or in accordance with the requirements of the agency having jurisdiction. The calculation of runoff and the evaluation of existing storm sewer drainage systems shall be as described herein paragraph entitled "Storm Drainage Collection Systems and Grading". Obtain required permits from the agency having jurisdiction prior to construction.

4-10.1 **Analysis of Existing System Capacity.** [The contractor shall provide design calculations that show the existing system is capable of handling the increased runoff from the improved site.] [The Installation shall state that the existing system is capable of handling the increased runoff from the improved site.]

4-10.2 **Storm Water Retention/Detention System for Volume Control.** [For volume control, an on-site storm water retention/detention system shall not be required.] [For volume control, an on-site storm water retention/detention system shall be required.] [For volume control, the contractor shall determine if an on-site storm water retention/detention system is required, based on the capacity of the receiving system and the installation requirements.]

4-10.3 **Storm Water Retention/Detention System for Runoff Treatment.** [For runoff treatment, an on-site storm water retention/detention system shall not be required.] [For runoff treatment, an on-site storm water retention/detention system shall be required.] [For runoff treatment, the contractor shall determine if an on-site storm water retention/detention is required, based on the requirements of the [insert appropriate agency].]

4-11 **STORM DRAINAGE COLLECTION SYSTEMS AND GRADING.**

4-11.1 **Location of Connections to Existing Systems.** [Insert installation specific connection location requirements.] [The contractor shall select the connection location. Establish the location for the connection based upon economics, design requirements, and downstream capacity.] Connect with a manhole or appropriate drainage structure.

4-11.2 **Building Connections.** Connection to building roof or area drain lines shall be designed and constructed in accordance with the International Building Code [2000 or latest edition].

4-11.3 **Storm Sewer System.** The storm sewer gravity drainage collection system shall be designed and constructed in accordance with the requirements of [Insert the state or local agency having jurisdiction] [Insert the appropriate State Department of Transportation Drainage Manual] [Insert the appropriate State Department of Transportation Road and Bridge Specifications]. Storm

sewer system shall be designed for a minimum of a 10-year return frequency and pipes shall be sized for full flow. The minimum velocity of flow in conduits during a design storm shall be 45 meters per minute [2.5 fps]. The pipe capacity shall be determined so that the calculated hydraulic grade line of the storm sewer drainage system(s) shall not exceed the curb flow line grade in pavements and the finished site grades.

4-11.4 **Manholes.** Manholes shall be located at intersections and changes in alignment or grade. Intermediate manhole maximum spacing shall be 75 m [250 ft] for pipes 900mm [3 ft] or less in diameter or box drains with the smallest dimension less than 900 mm [3 ft]. Maximum spacing for intermediate manholes on larger pipes and drain boxes shall be 150 m [500 ft]. Manholes and manhole appurtenances shall be [pre-cast concrete] [insert other acceptable materials] and shall conform to the [agency having jurisdiction] [Insert base standard]. Shape manhole inverts to the shape of the pipe with cast in place concrete after installing pipes. The manhole lid shall have a 600mm [2 ft]. minimum opening as measured from the face of the wall or ladder where applicable.

4-11.5 **Drainage of Grass Areas.** Except at personnel and overhead doors, the difference in grade between the finish floor elevation and the surface of the ground immediately adjacent to the building shall be a minimum of 150 mm [6 in]. Minimum slopes across grass surfaces shall be one percent. In grass areas, overland sheet flow shall be held to a maximum length of 30 m [100 feet]; then, a swale or an inlet must be used. Minimum slopes in swale centerlines shall be 0.5 percent. Maximum swale side slopes shall be 1V: 4H and maximum swale depth shall be 600 mm [24 in]. Ditches shall not be permitted. Storm drain pipe, sheet flow surfaces, and swales shall be designed to prevent standing water under normal conditions.

4-11.6 **Drainage of Roads and Pavements.** Provide a positive crown in all streets and roads. Minimum cross slopes in streets and roads shall 1:48 [1/4":1'] and the maximum cross slope shall be 1:32 [3/8":1'']. Minimum sheet flow slopes across parking area and other paved areas shall be 1 percent. Curbs and gutters shall be installed at a minimum longitudinal slope of 0.30 percent. Pavement collectors for storm water shall be by curb inlets and gutters, or drop inlets. Field inlets and an underground collection system shall drain open areas. Ditches shall not be permitted. Gutter spread (or inlet approach spread) in roads shall not exceed 3 m [10 ft] when measured from the face of curb. The amount of runoff to any one inlet in roads and parking areas shall not exceed the capacity of that inlet. The maximum spread allowable for determining inlet capacity shall equal that allowed for gutter spread in roads. The maximum spread allowable for determining inlet capacity in parking areas shall be height of curb or a depth of 150 mm [6 in], whichever is less.

4-11.7 **Materials.** All materials shall be in accordance with [insert the agency having jurisdiction or installation criteria]. [Select the allowable pipe materials based upon local conditions and facility criteria.] Pipe for culverts and storm drains may be of [[reinforced] concrete], [ductile iron,] [cast iron soil pipe,] [corrugated steel,] [corrugated aluminum alloy,] [ABS,] [PVC,] [insert other material here] or [HDPE].

4-11.8 **Field Quality Control for Storm Drainage System.** The [contracting officer] [Insert the appropriate person] will conduct field inspections. Testing procedures and requirements shall comply with the [requirements of the agency having jurisdiction.] [Insert the installation testing standards].

4-12 **PAVEMENT DESIGN CRITERIA.** Pavement design shall be in accordance with the [Insert state or local agency/ having jurisdiction] [Insert the state department of transportation road and bridge specification manual if desired or insert the installation standard]. Concrete curb [and

curb/gutter] [shall] [shall not] be required at the perimeter of all streets, roads, parking areas, and interior islands. For streets and roads, the design vehicle for this facility is [Insert the design vehicle]; the anticipated axle load for design is [Insert the estimated axle load for the design vehicle]; and the estimated volume of traffic is [Insert the estimated volume of traffic per day]. For bid purposes, assume that the existing subgrade soils after compaction will have a California Bearing Ratio (CBR) of [4] [Insert installation assumed CBR value based upon experience]. For parking areas, the design vehicle for this facility is [Insert the design vehicle], the anticipated axle load for design is [Insert the estimated axle load for the design vehicle], and the estimated volume of traffic (including current traffic loading and traffic loading as a result of this project) is [Insert the estimated volume of traffic per day]. For bid purposes, assume a California Bearing Ratio (CBR) of [4] [Insert assumed CBR value.] Designs for streets, walks, roads, and parking areas shall include adequate space for trees. Include landscape islands at the ends of rows of parking.

4-13 **PERMIT REQUIREMENTS.** [Timely acquisition of all the necessary design related permits shall be the responsibility of the Government; including the erosion and control permit, storm water management permit, discharge permit, [air permit] and the health department permit(s). Operating permits and licenses shall be the responsibility of the Contractor, in accordance with Section 00721, “Contract Clauses”.] [Timely acquisition of all the necessary design and construction related permits shall be the responsibility of the contractor. As some permit process times take 6 months or more, the Contractor, upon notice to proceed, shall immediately begin working on the permits so as not to delay completion of the project. The following permits have been identified as being required for this project: [Health Department Permits for Sanitary Sewer and Water], [Storm Water Management], [Erosion and Sediment Control], [National Pollution Discharge Elimination Service], [Wetland permits for mitigation, preservation and/or creation], [Insert any other design permits], [Excavation Permit], [Demolition Permit], [Disposal Permit] and [Insert any other permits required by the installation].

4-14 **GAS DISTRIBUTION SYSTEM**. [Insert " ... (DELETED)" if not applicable and delete remainder of text in sub-paragraphs.] [Coordinate with the installation to determine the responsible agency for installation of exterior gas lines, meters, regulators, hot taps, valves, etc. The design agent shall then add a sentence to this paragraph to inform the contractor of his or her responsibility.] Provide a gas distribution system, connected to existing systems and designed in accordance with local codes, utility company requirements, or installation regulations, whichever is more stringent. Gas distribution systems shall comply with the requirements of ASME B31.8. Connection to existing gas distribution system shall be made at the location shown on the enclosed RFP drawings. When connecting to existing steel piping system, provision shall be made to ensure that the integrity of the cathodic protection is not compromised. Shutoff valves shall be provided on the exterior of each building. A gas regulator and provision for future installation of an individual gas meter to monitor fuel use shall be provided for each building structure. The building service entrance shall be installed at a height sufficient to allow for future installation of the gas meter. Existing lines that are to be abandoned shall be either removed or physically disconnected from all gas sources and purged. Abandoning existing gas piping shall be done in accordance with ANSI B31.8, Gas Transmission and Distribution Piping Systems. Installation of gas piping will be in accordance with ANSI B31.8 and 49 CFR 192.

4-14.1 Materials. Materials and appurtenances shall be free of defects and suitable to accomplish the stated objectives of gas distribution systems. Pipe shall be polyethylene or steel as described below.

4-14.1.1 Polyethylene pipe. Shall conform to ASTM D2513, Standard Specification for

Thermoplastic Gas Pressure Piping Systems, with fittings complying with either ASTM D2513 or ASTM D2683, Standard Specification for Socket-Type Polyethylene Fittings for Outside Diameter-Controlled Polyethylene Pipe and Tubing. Connections to metal pipe shall comply with ANSI B16.5, Pipe Flanges and Flanged Fittings, or manufacturer's recommended standards.

4-14.1.2 Steel pipe. Shall conform to ASTM A 53, Grade A or B, Type E or S, Schedule 40. Furnace butt welded pipe may be used in sizes 40 mm [1-1/2 inch] and smaller. Fittings 40 mm [1-1/2 inch] and smaller shall conform to ASME B16.11. Pipe flanges and flanged fittings larger than 40 mm [1-1/2 inch], including bolts, nuts, and bolt patterns shall be in accordance with ASME B16.5, Class 150. Butt weld fittings shall be in accordance with ASME B16.9. Weld neck flanges shall be used.

4-14.2 Testing. Prove that the entire system of gas mains and service lines is gas-tight by an air test, in accordance with ANSI B31.8. The test shall continue for at least 24 hours between initial and final readings of pressure and temperature.

4-14.3 Drips. Unless high pressure natural gas is used, drips shall be installed at the low points, immediately following reduction from high pressure to medium pressure (at supply points) and at occasional low points throughout the system to provide for blowing out the lines.

4-14.4 Valves. Plug valves shall be installed at intersections of mains and other locations so that interruptions to service can be confined to no more than one building.

4-14.5 Mains and service lines. Lines shall not be placed under any buildings. Lines shall be placed with a minimum of 0.6 m [2 ft] of earth cover. Protective casings shall be provided to protect lines from superimposed street or heavy traffic loads.

4-15 **HEATING HOT WATER [AND CHILLED WATER] DISTRIBUTION.** [Insert "DELETED" if not applicable and delete remainder of text in all paragraphs.] Prefabricated piping system shall be installed to supply and return heating hot [and chilled] water to mechanical equipment rooms. Metallic pressure pipe, fittings, and piping accessories shall conform to the requirements of ASME B31.1 and shall be types suitable for the temperature and pressure of the water.

4-15.1 Piping materials.

4-15.1.1 Steel pipe. Piping shall conform to ASTM A 53, Grade B, standard weight, black or to ASTM A 106, Grade B, standard weight.

4-15.1.2 Copper tubing. Copper tubing shall conform to ASTM B 88, Type K or L.

4-15.1.3 Reinforced Thermosetting Resin Pipe (RTRP). RTRP pipe shall conform to ASTM D 5686.

4-15.1.4 Polyvinyl Chloride (PVC) Pipe. PVC pipe shall conform to ASTM D 2241 with a Standard Thermoplastic Pipe Dimension Ratio (SDR) of 26 and PVC 1120 or 1220 as the material.

4-15.2 Casing materials.

4-15.2.1 Polyvinyl Chloride (PVC) Casing. PVC casings shall conform to ASTM D 1784, Class 12454-B with a minimum thickness equal to the greater of 1/100 the diameter of the casing or 1.50 mm. 60 mils.

4-15.2.2 Polyethylene (PE) Casing. Polyethylene casings shall conform to ASTM D 1248, Type III, Class C, Category 3 or 4, Grade P 34 with thickness as follows:

Casing Diameter	Minimum Thickness

(in mm)	(in mm)
250 and smaller	3
250 to 450	4
450 to 600	5
over 600	6

Casing Diameter (in inches)	Minimum Thickness (in mils)
10 and smaller	125
10 to 18	150
18 through 24	200
over 24	225

4-15.2.3 Reinforced Thermosetting Resin Pipe (RTRP) Casing. RTRP casing shall be of the same material as the pipe, with casing thickness as follows:

Casing Diameter (in mm)	Minimum Thickness (in mm)
200 and smaller	1.2
250	2.0
300	2.7
350	2.9
400 to 450	3.0
500	3.2
600	3.9

Casing Diameter (in inches)	Minimum Thickness (in mils)
8 and smaller	70
10	80
12	105
14	115
16 to 18	120
20	125
24	155

4-15.3 End seals. Each preinsulated section of piping shall have a complete sealing of the insulation to provide a permanent water and vapor seal at each end of the preinsulated section of piping. Preinsulated sections of piping modified in the field shall be provided with an end seal which is equivalent to the end seals furnished with the preinsulated section of piping. End seals must be tested and certified in accordance with manufacturer's recommendations.

4-15.4 Insulation.

4-15.4.1 Factory applied insulation. Prefabricated pipe and fittings shall be insulated in the factory. Foam insulation for prefabricated insulated pipe and fittings shall be polyurethane foam meeting the requirements of ASTM C 591 having a density not less than 32 kg per cubic meter

(2 pounds per cubic foot). The polyurethane foam shall completely fill the annular space between the carrier pipe and the casing. Insulation thickness shall be a minimum of [20] [_____] mm ([0.9] [_____] inches). The insulation thermal conductivity factor shall not exceed the numerical value of 0.02 W/mK at 24 degrees C (0.15 Btu-inch/square foot-degree F-hour at 75 degrees F), when tested in accordance with ASTM C 518. Manufacturer shall certify that the insulated pipe is free of insulation voids.

4-15.4.2 Field applied insulation. Field applied insulation for fittings, and field casing closures, if required, and other piping system accessories shall be polyurethane matching the pipe insulation. Thickness shall match adjacent piping insulation thickness. Buried fittings and accessories shall have field applied polyurethane insulation to match adjacent piping and shall be protected with a covering matching the pipe casing. Shrink sleeves with a minimum thickness of 1.3 mm 50 mils shall be provided over casing connection joints.

4-15.5 Thrust blocks. Thrust blocks shall be installed at the locations shown or recommended by the pipe system manufacturer. No pipe joint shall be embedded in concrete unless the assembly has previously been hydrostatically tested. The thrust blocks shall provide for transfer of thrusts and reactions without exceeding the allowable stress of the concrete and shall be installed in accordance with pipe manufacturer's instructions. In muck or peat, all thrusts shall be resisted by piles or tie rods to solid foundations or by removal of peat or muck which shall be replaced with ballast of sufficient stability to resist thrusts.

4-15.6 Expansion loops. Expansion loops and expansion bends (Z- and L- type) shall be factory fabricated of casing, insulation, and carrier piping identical to that furnished for straight runs. Expansion loops and bends shall be properly designed in accordance with the allowable stress limits indicated in ASME B31.1 for the type of pipe used. Expansion loops and bends shall be shipped to the jobsite in the maximum size sections feasible to minimize the number of field joints. The expansion loops and bends casing and insulation where applicable, shall be suitably sized to accommodate pipe movement. Field joints shall be made in straight runs of the expansion loops and bends, and the number shall be kept to a minimum.

4-15.7 Manholes and anchors. Manholes shall be designed and installed as recommended by the system manufacturer. Anchor design shall be in accordance with the published data of the manufacturer and for prefabricated systems shall be factory fabricated by the prefabricated system manufacturer. In all cases, the design shall be such that water penetration, condensation, or vapor transmission will not wet the insulation.

4-15.8 Installation. The piping system furnished shall be installed in accordance with the piping system manufacturer's instructions. The Contractor shall obtain the services of a trained representative of the pipe system manufacturer to instruct the Contractor's work forces in the installation procedures to ensure that the system is installed in accordance with the manufacturer's published instructions and the plans and specifications. The manufacturer's representative shall be a person who regularly performs such duties for the manufacturer.

4-15.9 Testing. The carrier piping shall be hydrostatically tested at 1 ½ times the working pressure for the system. The casing shall be tested in accordance with the manufacturer’s recommendations.

4-16 **STEAM [AND CONDENSATE RETURN] [HIGH TEMPERATURE HOT WATER] DISTRIBUTION.** [Insert "DELETED" if not applicable and delete remainder of text in all paragraphs.] Distribution system shall be installed to supply steam to [and return condensate from] mechanical equipment rooms. A complete underground [heat distribution] [and] [condensate return] system including all required components such as carrier pipes, [steam pipe,] [high temperature hot water supply pipe,] [condensate return pipe,] [high temperature hot water return pipe,] and fittings, anchors, pipe supports, insulation, protective casing, and

cathodic protection, for the system supplied. Gland type end seals will not be permitted. Drainable-Dryable-Testable (DDT) systems with fiberglass casings shall not be permitted.

4-16.1 Piping materials.

4-16.1.1 Steam and High Temperature Hot Water Pipe. Pipe material shall be steel; seamless ASTM A 53, Grade B or ASTM A 106, Grade B; or electric resistance welded ASTM A 53, Grade B; Schedule 40. Standard weight will be permitted for pipe sizes 300 mm 12 inches and above. ASTM A 53, Type F furnace butt welded pipe will not be allowed. Joints will not be allowed in the factory fabricated straight section of the carrier pipe. Factory fabricated piping sections, as part of an expansion loop or bend, shall have all welded joints 100% radiographically inspected in accordance with ASME B31.1.

4-16.1.2 Condensate pipe. Pipe shall be steel; seamless ASTM A 53, Grade B or ASTM A 106, Grade B, schedule 80; electric resistance welded ASTM A 53, Grade B; Schedule 80. ASTM A 53, Type F furnace butt welded pipe will not be allowed. Joints will not be allowed in the factory fabricated section of the carrier pipe. Factory fabricated piping sections, as part of an expansion loop or bend shall have all welded joints 100% radiographically inspected in accordance with ASME B31.1.

4-16.2 Factory fabricated, direct-buried DDT systems.

4-16.2.1 Casing. Casing shall be smooth-wall steel, electric resistance spiral welded, conforming to ASTM A 134, ASTM A 135, or ASTM A 139. Minimum casing thickness shall be 6.35 mm (0.25 inches). Eccentric connectors shall be provided between casing sections as needed to provide drainage of casing section between manholes and between manholes and buildings.

4-16.2.2 Casing End Plates, Vents, and Drains. End plates shall be made of ASTM A 36/A 36M steel, minimum thickness 13 mm (1/2 inch) for conduit pipe sizes above 300 mm (12 inches) and 9.5 mm (0.375 inches) for conduit pipe sizes 300 mm (12 inches) and less. A 25 mm (1 inch) ASTM A 53, Sch 40, galvanized vent riser pipe shall be provided on end plate vent opening. Vent pipe shall extend to top of manhole and terminate 300 mm (12 inches) above grade with a 180 degree bend. A 25 mm (1 inch) drain shall be provided at the bottom and vent at the top. Brass plugs and half coupling, constructed with welded steel and welded to the end plate, shall be furnished; drains shall be plugged; vents shall not be plugged.

4-16.2.3 Air space. Continuous 25 mm 1 inch minimum air space shall be provided between carrier pipe insulation and casing.

4-16.2.4 Casing coating. Coating shall be rated by manufacturer for continuous service for at least 25 years at temperatures of 110 degrees C. 230 degrees F. Coating shall be applied in accordance with the coating manufacturer's instructions, shall be factory inspected for holidays and repaired as necessary.

4-16.2.5 Field connections. Field connection of casing sections shall be made using a compatible steel section, welded to casing sections, coated on all surfaces with manufacturer's coating field repair compound, and covered with a 1.3 mm (0.05 inch) minimum thickness polyethylene shrink sleeve designed for a service temperature exceeding 80 degrees C (176 degrees F).

4-16.3 Factory fabricated, direct-buried water spread limiting (WSL) systems.

4-16.3.1 Casing for Steam and Condensate. The casing shall be reinforced thermosetting resin plastic (RTRP) piping manufactured by the filament winding process. The casing pipe shall be wound to meet ASTM D 2310 classification RTRP and ASTM D 2996. The resin shall be a polyester isothalic resin. The outer surface shall be coated with a pigmented, protected

resin containing a parafinated wax and ultraviolet inhibitors. Casing thickness shall be 5 mm (0.185 inches) for 100 mm (4 inches) and below carrier pipe sizes and 6.5 mm (0.25 inches) for carrier pipe sizes above 100 mm (4 inches). Condensate piping shall not be located in casings which contain any other piping.

4-16.3.2 End seals. Each preinsulated section of piping shall completely seal the insulation, providing a permanent water and vapor seal at each end. Preinsulated factory fabricated sections of piping modified in the field shall be provided with an end seal which is equivalent to the end seals furnished with the preinsulated section of piping.

4-16.3.3 Pipe coupling, steam. Coupling shall be of a multi-stage seal designed to accommodate the expansion and contraction of the system in the coupling. Couplings shall be of corrosion resistant materials. The annular seals and carrier pipe ends shall be specifically designed to protect the seals and resist abrasion due to lateral loads in the system.

4-16.3.4 Pipe coupling, condensate. Coupling shall be a single stage seal design to accommodate the expansion and contraction of the adjacent pipes. Coupling shall be of corrosion resistant materials. The annular seals and carrier pipe ends shall be specifically designed to protect the seals and resist abrasion due to lateral loads in the system.

4-16.4 Insulation. The minimum thickness of insulation for the heat distribution system shall be in accordance with Tables 1 and 2.

Table 4.2 Minimum Pipe Insulation Thickness (mm)
For Steam (100 to 2.800 kPa (gage)) and High Temperature
Hot Water Supply and Return (120 to 230 degrees C)

	INSULATIONS For Drainable/Dryable Systems			INSULATIONS For other Pre-Engineered Systems	
Nominal Pipe Diameter (mm)	Paroc	Epitherm Delta	Kaylo-10 Thermo-12 Super Caltemp	Calcium Silicate	WSL Polyurethane
25	50	63	100	N/A	N/A
40	50	63	100	N/A	N/A
50	63	85	110	N/A	N/A
65	63	85	110	N/A	N/A
80	75	100	125	25	+31
100	75	100	125	25	+31
125	75	100	125	N/A	N/A
150	85	110	135	35	+34
200	85	110	135	50	+30
250	100	125	150	63	+33
300	100	125	150	50	+32
350	100	125	150	N/A	N/A
400	100	125	150	N/A	N/A
450	100	125	150	N/A	N/A

**Table 4.3 Minimum Pipe Insulation Thickness (inches)
For Steam (16 to 408 psig) and High Temperature
Hot Water Supply and Return (250 to 450 degrees F)**

	INSULATIONS For Drainable/Dryable Systems			INSULATIONS For other Pre-Engineered Systems	
Nominal Pipe Diameter (inches)	Paroc	Epitherm Delta	Kaylo-10 Thermo-12 Super Caltemp	Calcium Silicate	WSL Polyurethane
1.0	2.0	2.5	4.0	N/A	N/A
1.5	2.0	2.5	4.0	N/A	N/A
2.0	2.5	3.5	4.5	N/A	N/A
2.5	2.5	3.5	4.5	N/A	N/A
3.0	3.0	4.0	5.0	1.0	+1.23
4.0	3.0	4.0	5.0	1.0	+1.22
5.0	3.0	4.0	5.0	N/A	N/A
6.0	3.5	4.5	5.5	1.5	+1.34
8.0	3.5	4.5	5.5	2.0	+1.21
10.0	4.0	5.0	6.0	2.5	+1.31
12.0	4.0	5.0	6.0	2.0	+1.29
14.0	4.0	5.0	6.0	N/A	N/A
16.0	4.0	5.0	6.0	N/A	N/A
18.0	4.0	5.0	6.0	N/A	N/A

**Table 4.4 Minimum Pipe Insulation Thickness (mm)
For Condensate Return and High Temperature Hot Water Return System**

Nominal Pipe Diameter (mm)	Paroc	Epitherm Delta	Kaylo-10 Thermo-12 Super Caltemp	Polyurethane
25	35	50	75	N/A
40	35	50	75	N/A
50	35	50	75	19
65	35	50	75	N/A
80	50	63	85	26
100	50	63	85	26
125	50	63	85	N/A
150	63	76	110	30
200	63	76	110	N/A
250	76	100	125	N/A
300	76	100	125	N/A
350	76	100	125	N/A
400	76	100	125	N/A
450	76	100	125	N/A

Table 4.5 Minimum Pipe Insulation Thickness (inches)
For Condensate Return and High Temperature Hot Water Return System

Nominal Pipe Diameter (inches)	Paroc	Epitherm Delta	Kaylo-10 Thermo-12 Super Caltemp	Polyurethane
1.0	1.5	2.0	3.0	N/A
1.5	1.5	2.0	3.0	N/A
2.0	1.5	2.0	3.0	0.77
2.5	1.5	2.0	3.0	N/A
3.0	2.0	2.5	3.5	1.05
4.0	2.0	2.5	3.5	1.05
5.0	2.0	2.5	3.5	N/A
6.0	2.5	3.0	4.5	1.32
8.0	2.5	3.0	4.5	N/A
10.0	3.0	4.0	5.0	N/A
12.0	3.0	4.0	5.0	N/A
14.0	3.0	4.0	5.0	N/A
16.0	3.0	4.0	5.0	N/A
18.0	3.0	4.0	5.0	N/A

4-16.5 Expansion loops and bends. Stresses shall be less than the maximum allowable stress from the Power Piping Code (ASME B31.1). Detailed design layout drawings and stress and anchor force calculations shall be provided for all loops and bends. Locations of all anchors, guides and supports shall be shown. Pipe-stress and system-expansion calculations for each expansion compensation elbow using a finite element computer generated 3 dimensional analysis. Calculations shall demonstrate that pipe stresses from temperature changes are within the allowable requirements in ASME B31.1 and that the anchors and the guides will withstand the resultant forces. Detailed design layout drawings shall include all analysis node points. As a minimum, computer analysis results shall include node stresses, forces, moments and displacements. Calculations shall be stamped by a registered Professional Engineer in the employ of the system manufacturer.

4-16.6 Manholes and anchors. Design and installation shall be in accordance with the published data of the manufacturer.

4-16.7 Installation. The piping system furnished shall be installed in accordance with the piping system manufacturer's instructions. The Contractor shall obtain the services of a trained representative of the pipe system manufacturer to instruct the Contractor's work forces in the installation procedures to ensure that the system is installed in accordance with the manufacturer's published instructions and the plans and specifications. The manufacturer's representative shall be a person who regularly performs such duties for the manufacturer.

4-16.8 Testing. The carrier piping shall be hydrostatically tested at 1 ½ times the working pressure for the system. The casing shall be tested in accordance with the manufacturer's recommendations.

4-17 **FUEL OIL STORAGE AND DISTRIBUTION.** [Insert "DELETED" if not applicable and delete remainder of text in all paragraphs.] Fuel oil storage and distribution system shall be

installed to supply the fuel oil-fired heating equipment. Provide a complete fuel oil storage and distribution system designed in accordance with local codes, installation requirements, NFPA 30, and NFPA 31, whichever are more stringent. Tank size shall be determined using the ASHRAE Degree Day Method using the degree-days for the coldest 30-day period for the site.

4-17.1 Tank storage. Each facility shall be provided with a separate fuel oil storage tank. Fuel oil storage tanks may be located underground or aboveground. Storage tanks shall be placed in a location suitable for filling from a curbside delivery truck. Above ground tanks shall be visually screened by a wall. Fuel oil tanks shall be located in accordance with local codes, and shall be installed a minimum of 0.3 m [1 ft] from the edge of the tank shell to the nearest outside wall of any building or basement or from the nearest adjoining property line. Where tanks are located adjacent to exterior walls or other surfaces requiring periodic painting or other maintenance/repair requirements, a minimum clearance of 1m [3ft] from the edge of the tank is preferred. Underground tanks shall be located such that loads supported by building foundations cannot be transferred to the tank. Proposed tank location shall be clearly indicated in the design submittal.

4-17.1.1 Aboveground tanks. Fuel oil storage tanks shall be aboveground, double wall type with leak detection monitoring. Tank containment shall comply with applicable NFPA, EPA, and local code requirements. Provide concrete pads as required by code or as recommended by the tank manufacturer.

4-17.1.2 Underground tanks. Fuel oil storage tanks installed below grade shall be double-walled type constructed using fiberglass or steel, and installed in accordance with the manufacturer's recommendations. The top of the tank shall be at least 0.6 m [2 ft] below finished grade. Fiberglass tanks shall be constructed in accordance with UL 1316. Steel tanks shall be Type II, constructed in accordance with UL 58, with an STI-P3 coating and guarantee except that the cathodic protection system shall be based on protecting 5 percent of the tank's metal surface. Tanks shall be provided with the necessary fill, vent, gauge, hatch, and suction connections.

4-17.2 Fuel oil piping. Underground fuel oil piping shall be of double-wall construction, installed without traps or sags. Outer, secondary containment pipe shall be non-metallic. Above ground piping shall be single-wall metallic pipe. Gate valves shall not be used in fuel oil piping systems. A replaceable filter shall be provided upstream of the fuel oil pump. Pipe connectors shall be in accordance with UL 567.

4-17.3 Leak detection system. A continuous surveillance leak detection system suitable for operation in an NFPA 70, Class 1, Division 1, Group D environment shall be provided to monitor the leak containment space between the interior and exterior walls of double-wall pipe and tanks. The system shall detect leakage into the containment space electronically or by monitoring interstitial pressure or liquid level variations. Liquids used in the containment space for steel tanks shall have a corrosion inhibitor. Liquids subject to freezing conditions shall contain an antifreeze solution. The leak detection system shall be compatible with the piping and tank furnished. Instructions and equipment required for calibration of the leak detection system and manufacturer's recommended calibration maintenance schedule shall be provided.

4-17.4 Special requirements. [Research local requirements for fuel oil systems installation and either add or delete items from this sub-paragraph.]

4-17.4.1 Spill containment fill. Underground tank fill connection shall be provided in a spill container of 11.4 L [3 GAL] capacity minimum. Contained spills shall be drained into the storage tank by means of a quick-acting drain valve.

4-17.4.2 Overfill prevention valve. The overfill prevention valve shall be placed within the tank interior and be an integral part of the fill tube. The valve shall be a float actuated shut-off valve.

The valve shall be constructed of the same material as the fill tube. The valve shall have two stages of shutoff. In the first stage, the valve shall restrict the flow of fuel oil into the tank to approximately 0.315 L/s [5 gpm] when the liquid level rises above 95 percent of the tank capacity. In the second stage, the valve shall completely stop the flow of fuel oil into the tank when the liquid level rises above 98 percent of the tank capacity.

4-17.4.3 Tank screening. Provide sight screening for the tank to reduce the visual impact of the fuel oil storage tank. Visual screening may be vegetation or fencing, in compliance with the local standards. [Design District shall ensure that aboveground fuel oil storage tanks are suitably screened from view. The requirements of this paragraph may be modified to suit local requirements.]

4-18 **LIQUEFIED PETROLEUM (LP) GAS STORAGE AND DISTRIBUTION.** LP gas tanks shall comply with requirements of NFPA 58 and the ASME Code, Section VII, Pressure Vessels. Tanks shall be pad mounted, and shall not be located inside any building. Tanks shall be provided with all required gauges, shut off valves, safety devices, and suction connections. Shut off valves shall be installed at each tank, at the service entry to the building (if not in sight of the tank), and at each heating unit. No shut off valve shall be installed between a safety device and tank. LP gas pressure shall be reduced to a minimum service pressure of 3.5 kPa [½ psi] prior to the building entrance. LP gas pipe connectors shall be in accordance with UL 567.

4-19 **ELECTRICAL DISTRIBUTION.** [Design District shall determine where power is to be obtained, if system is to be overhead or underground, and provide applicable characteristics of the primary system.]

4-19.1 Overhead distribution. System shall consist of wood, steel, aluminum or concrete poles and bare copper conductors. Design shall be in accordance with ANSI C2 and NFPA 90.

4-19.2 Underground distribution. System shall consist of direct buried conduit and copper conductors. Design shall be in accordance with ANSI C2 and NFPA 90.

4-19.3 Service entrance. Shall be in accordance with NFPA 90.

4-19.4 Transformers. Transformers shall be pad mount. The high voltage compartment shall contain incoming primary feeder, load break switch, fuse protection and surge protection. The nameplate rating for the transformer shall not be less than 90 percent of the KVA demand load calculated for the transformer. [Insert transformer sizing, demand performance and other applicable characteristics.]

4-19.5 Street and area lighting. Residential roadway lighting, including collector streets, shall be provided in accordance with the IES Lighting Handbook. Provide lighting at roadway intersections, and at intervals not exceeding 60.9 m [200 ft] between intersections. Area lighting shall be provided at intervals not exceeding 60.9 m [200 ft] along area walkways not otherwise illuminated, common area walks, and at all steps in area walkways. Area lighting shall be provided in accordance with the IES Lighting Handbook. Luminaries shall be actuated by photoelectric control, one photocell per circuit.

4-19.6 Metering. [Design District shall determine metering requirements.]

4-20 **TELEPHONE**. The [Telephone company] [DOIM] [Contractor] will furnish and install distribution cables. Conduit required between underground terminal boxes and the buildings shall be provided by the Contractor. Trenching and backfill required to install the telephone company cables shall be included in the construction contract. Contractor provided boxes, conduits, and trenching shall comply with local telephone company criteria and shall be coordinated with the telephone company. Coordinate with Installation Director of Information Management (DOIM) for specific requirements.

4-21 **TELEVISION**. [Provide commercial cable TV or site distribution system(s) when feasible. Requirements to be edited in accordance with local conditions and availability.] An antenna system or connection to a TV distribution system shall be provided for each facility. The TV system shall provide for UHF and VHF reception for color TV. The antenna system may be either a common antenna serving the entire project (mast or dish), an attic antenna system for each separate building, or attic antenna for each facility [Edit as required]. The Contractor shall provide all trenching, conduit, boxes, and backfilling required to install commercial and/or Contractor provided distribution systems.

4-22 **CATHODIC PROTECTION**. Cathodic Protection (CP) is mandatory on buried ferrous metallic structures as described below:

4-22.1 Department of Transportation guidance. Shall be as stated in 49 CFR, Part 192, requires that all metallic natural gas piping be coated and cathodically protected regardless of the soil resistivity.

4-22.2 Corrosion control. Mandated for all metallic underground storage tanks storing petroleum or hazardous substance by 40 CFR, Part 280 and AR 200-1 and on hazardous liquid pipelines (e.g., liquid fuel) by 49 CFR, Part 195.

4-22.3 Design requirements. CP systems must be designed to provide protective potential to meet the requirements of the National Association of Corrosion Engineers (NACE) Standard RP-0169, Control of External Corrosion on Underground or Submerged Metallic Piping Systems, or NACE Standard RP-0185, Control of External Corrosion on Metallic Buried, Partially Buried, or Submerged Liquid Storage Systems, as appropriate.

4-22.4 Compatibility. New or supplemental CP systems shall be compatible with existing CP systems and other adjacent structures or components. New systems should be compatible with existing systems to allow ease of repair and maintenance.

4-22.5 Tracer wire. When plastic pipe is used to extend a steel gas distribution main, an insulated No. 8 AWG copper wire shall be exothermically welded to the existing steel main and run the length of the new plastic main. This wire can be used as a locator tracer wire and to maintain continuity to any future steel gas main extension.

4-22.6 Coatings. CP and protective coatings shall be provided for the following buried and submerged ferrous metallic structures regardless of soil or water resistivity.

4-22.6.1 Natural gas and propane piping.

4-22.6.2 Liquid fuel piping.

4-22.6.3 Underground fuel storage tanks. Not required for those coated in accordance with UL1746.

4-22.6.4 Fire protection piping.

4-22.6.5 Ductile or cast iron piping. Required for pressurized piping under floor (slab on grade) in soil.

4-22.6.6 Conduit piping systems. Required for underground heat distribution and chilled water piping in ferrous metallic conduit.

4-22.6.7 Hazardous storage structures. Structures with hazardous products as identified by the installation.

4-22.7 Cast iron pipe. Shall be treated as follows:

4-22.7.1 Below 10,000 Ohm-cm: For soil resistivity below 10,000 Ohm-cm at pipeline installation depth, provide CP, bonded joints, and protective coatings.

4-22.7.2 Between 10,000 and 30,000 Ohm-cm: For soil resistivity between 10,000 and 30,000 Ohm-cm at pipeline installation depth, provide bonded joints only.

4-22.8 Copper water service lines: Piping will be dielectrically isolated from ferrous pipe. Dielectric isolation shall conform with NACE RP-0286.

4-22.9 Ductile iron piping systems: Conduct an analysis (except for ductile iron piping under floor in soil) to determine if CP and/or bonded or unbonded coatings are required. Unbonded coatings are defined in ANSI/AWWA C105/A21.5.

4-22.10 Economic analysis: Conduct an economic analysis to determine if CP and protective coatings should be provided for gravity sewer lines and the following structures in soil resistivity conditions above 10,000 Ohm-cm:

4-22.10.1 Potable water lines.

4-22.10.2 Concentric neutral cable.

4-22.10.3 Other structures. Buried and submerged ferrous metallic structures not covered above.

4-22.11 Contact with concrete. Ferrous metallic piping passing through concrete shall not be in contact with the concrete.

CHAPTER 5

ARCHITECTURAL DESIGN

5-1 **DESIGN GOALS.** Overall architectural goals for the UEPH complex are to provide a functional, visually appealing campus of facilities that is a source of pride for residents, other facility users, and the installation.

5-1.1 **Site Planning Objectives**. Provide a pedestrian-oriented site. Locate buildings to create outdoor spaces. Group buildings in configurations that create a sense of community and enable residents to readily identify their homes. Integrate sustainable design principles by retaining and using existing topography to advantage; preserve environmentally sensitive areas and reduce overall project impact on the site.

5-1.2 **Exterior Design Objectives**. Design buildings to enhance the visual environment of the installation. Exterior materials, roof forms, and detailing shall comply with the Installation Design Guide, and shall be compatible with the immediate local context. Use durable, low-maintenance materials. Configure building massing and use exterior elements such as colonnades, porticos, entry porches, and material detailing to provide human scale.

5-1.3 **Interior Design Objectives**. Arrange spaces in an efficient, functional manner. Provide simple circulation schemes that allow easy wayfinding within buildings. Use durable materials and furnishings that can be easily maintained and replaced. Maximize use of daylighting and operable windows. Use interior surfaces that are easy to clean and light in color; avoid trendy or bright color schemes. Design UEPH interiors with a residential ambience. To the extent possible, design interiors that residents can personalize (for example, arrange living units to allow more than one furniture placement scheme; provide telephone/data jacks on multiple walls to allow optional locations for the desk). Structure interior spaces to allow maximum flexibility for future modifications; companies and battalions often change size or mission, requiring reconfiguration of facilities.

5-1.4 **Material and Product Selection Criteria**. Materials shall meet the requirements of the SOW. The SOW includes a range of specificity: some material requirements are specific (no option); other material requirements allow a range of options. The SOW requirements establish a minimum quality level. Higher quality materials will be judged more favorably. The offeror's proposal shall identify the quality level of all major materials to be provided.

5-2 **APPLICABLE CODES AND STANDARDS**. Except as specified otherwise in the RFP, design and construction of facilities shall comply with the latest editions (as of the date of the RFP) of the following. Major criteria references for building design are listed below; additional requirements are included throughout the RFP. Refer to Appendix A for a list of criteria references, and sources of availability.

5-2.1 National Fire Codes, published by the National Fire Protection Association (NFPA), including NFPA 101 Life Safety Code.

5-2.2 International Building Code (IBC).

5-2.3 Federal Std 795 Uniform Federal Accessibility Standards (UFAS), and Americans With Disabilities Act Accessibility Guidelines for Buildings and Facilities (ADAAG). Where these criteria conflict, the most stringent requirement shall apply.

5-2.4 Interim Department of Defense Antiterrorism / Force Protection Standards.

5-2.5 The [insert name of post] Installation Design Guide (IDG), excerpts of which are included in an appendix to the Statement of Work.

5-2.6 [Insert any additional regulations known to have an impact on facility design and construction, such as airfield height limitations; AICUZ/APZ information; historic area requirements; etc. Include excerpts of the document in an appendix to the SOW, or include source of availability in Appendix A References.].

5-3 **IBC OCCUPANCY AND BUILDING TYPE CLASSIFICATIONS**.

5-3.1 **General**. Occupancy classifications, construction types, allowable areas, maximum building heights, and fire separation requirements shall comply with the requirements of the International Building Code.

5-3.2 **UEPH Buildings**. Occupancy classification: Residential Group R-1.

5-3.3 **Company Operations Facilities**. [Note: previously constructed COFs have used Uniform Building Code Group B occupancy classification throughout. The following International Building Code occupancy classifications of spaces within the COF are intended to more accurately represent the uses of each area in the facility. Prior to issuance of the RFP, the design district shall coordinate with the authority having jurisdiction to determine occupancy classifications. Consult with the users to determine the hazard classification of items to be stored in the supply spaces. This model Statement of Work is written based upon IBC Storage Group S-1 or S-2 classification of the Arms Vault and other supply spaces. If hazardous materials, ammunition or other explosives will be stored, the IBC will require classification of the space as High-Hazard Group H-1, and if the amount of explosive material exceeds the maximum allowable quantity per control area, a separate building will be required (see IBC Section 307 and Table 307.7(1)). This, obviously, has a significant impact on the facility design and cost, and must be determined prior to issuance of the RFP.]. Occupancy classification of administrative areas, and locker room facilities serving less than 50 occupants: Business Group B. Occupancy classification of supply areas: Storage Group S-2 [or S-1; verify contents of spaces with user]. Common Locker Rooms for 50 or more occupants: Assembly Group A-3.

5-3.4 **Battalion Headquarters**. Occupancy classification of administrative areas: Business Group B. Occupancy classification of classroom areas: Assembly Group A-3.

5-3.5 **Brigade Headquarters**. Occupancy classification: Business Group B.

5-4 **EXTERIOR DESIGN**.

5-4.1 **Acceptable Materials and Colors**. Exterior elements of the facilities shall comply with the Installation Design Guide (IDG) unless required otherwise by applicable codes or this Statement of Work.

5-4.2 **Exterior Walls**. Comply with IDG. Where masonry exterior wall finish material is used, and where allowed by code, concrete masonry or metal stud backup wall may be used. Exterior insulation finish systems shall not be used [may be used as exterior accent materials, not primary wall material] [Coordinate with installation facilities engineer (DPW) and edit

appropriately].

5-4.3 **Roofs**. Sloped roofs with a minimum pitch of [__] : 12 shall be used on all buildings. Roofing material and color shall comply with IDG. Roofing system shall have Underwriters Laboratory (UL) Class A rating for fire resistance, UL 90 wind resistance rating, and Factory Mutual (FM) 1-90 fire and wind resistance rating

5-4.3.1 **Metal Roofing**. Provide manufacturers 20-year finish warranty.

5-4.3.2 **Asphalt Shingle Roofing**. Provide minimum 30-year shingles; provide minimum 30# felt underlayment. Provide self-adhering rubberized ice and water shield underlayment at all valleys, and roof perimeter [review requirement in regard to local climate].

5-4.4 **Trim and Flashing**. Materials and colors shall comply with IDG. [Review the IDG to make sure that trim and flashing materials and colors are sufficiently covered.] Gutters, downspouts, and fascias shall be prefinished metal; comply with SMACNA Architectural Sheet Metal Manual; provide 20 year manufacturers finish warranty.

5-4.5 **Miscellaneous Exterior Elements**. Comply with IDG. [review the IDG to make sure that trim and minor elements are sufficiently covered. It is advisable to prohibit any use of exterior wood with painted finish; require prefinished metal trim. If not stated in IDG, require exterior metal railings to be prefinished aluminum, or if acceptable to installation facilities engineer (DPW), allow the more economical option of using field-painted (and adequately pre-treated) galvanized steel railings. Coordinate with user to include requirements for any building-mounted operational items such as communications antennae, special lighting, warning beacons, etc.].

5-4.6 **Signage**. Comply with IDG. [Coordinate with installation facilities engineer (DPW); provide criteria for quantity, type, size and location of building identification signs. Note whether signs require illumination].

5-4.7 **Exterior Doors and Frames**.

5-4.7.1 **Main Entrance Doors**. Doors opening to building corridors or lobbies shall be aluminum storefront doors and frames with Architectural Class I anodic finish or AAMA 2605 organic coating finish. Color shall comply with IDG. Doors shall be minimum 45 mm [1-3/4”] thick. Fully glazed stile and rail doors shall be medium or wide stile. Provide aluminum storefront systems that comply with wind load requirements of applicable codes. Framing systems shall have thermal-break design.

5-4.7.2 **Exterior Non-entrance Doors**. Exterior doors and frames opening to spaces other than corridors or lobbies shall be hollow metal; comply with ANSI A250.8/SDI 100. Doors shall be Level 3, physical performance Level A, Model 2; insulated; top edge closed flush. Frames shall be Level 3, 14 gauge, with continuously welded corners and seamless face joints. Doors and frames shall be constructed of hot dipped zinc coated steel sheet, complying with ASTM A653, Commercial Steel, Type B, minimum A40 coating weight; factory primed. Anchors and accessories shall be zinc coated. Frames in masonry shall have bituminous back-coating, plaster guards, and shall be grouted solid. Fire-rated openings shall comply with NFPA 80, and the requirements of the labeling authority.

5-4.7.3 **Exterior Door Finish Hardware**.

5-4.7.3.1 **Hinges**. ANSI/BHMA A156.1; template, full mortise, heavy duty, ball bearing, minimum size 4 ½" x 4 ½ ", non-ferrous base metal, non-removable pins.

5-4.7.3.2 **Locksets on Living Unit Entry Doors**. ANSI/BHMA A156.13; mortise lockset with removable core; non-ferrous base metal.

5-4.7.3.3 **Locksets on Exterior Hollow Metal Doors**. ANSI/BHMA A156.2; series 4000, Grade 1, non-ferrous base metal, removable core.

5-4.7.3.4 **Exit (Panic) Devices**. ANSI/BHMA 156.3; heavy-duty touch-pad type, through-bolted mounting. Listed and labeled for panic protection based on UL 305.

5-4.7.3.5 **Closers**. ANSI/BHMA A156.4; series C02000, Grade 1, hydraulic, factory-sized, adjustable to meet field conditions. Provide for all exterior doors, all entry doors to living units, all doors opening to corridors and as required by codes. At exterior doors to lobbies, corridors, mechanical rooms, janitors closets, and COF supply areas provide overhead holders or closers with hold-open capability.

5-4.7.3.6 **Auxiliary Hardware**. ANSI/BHMA A156.16. Provide wall or floor stops for all exterior doors that do not have overhead holder/stops. Provide other hardware as necessary for a complete installation.

5-4.7.3.7 **Thresholds**. ANSI/BHMA A156.21; non-ferrous metal. Provide at all exterior doors.

5-4.7.3.8 **Weatherstripping**. ANSI/BHMA A156.22. Provide at all exterior doors.

5-4.7.3.9 **Kick Plates**. ANSI/BHMA A156.6; non-ferrous metal. Provide at all doors with closers.

5-4.8 **Exterior Windows**. Provide aluminum windows complying with American Architectural Manufacturers Association AAMA/NWWDA 101 / I.S. 2. Minimum performance class shall be Heavy Commercial (HC). Minimum wind load, and resulting design pressure and performance grade shall be determined in accordance with the International Building Code (IBC). Provide windows with insulating glass and thermal break necessary to achieve a minimum Condensation Resistance Factor (CRF) of 45 [edit to require higher factor for very cold climates]. Finish shall be Architectural Class I anodic coating or AAMA 2605 organic coating [Edit to allow anodic coating if clear or bronze anodized color is acceptable]. All sleeping rooms shall have operable windows complying with egress requirements of applicable codes. Operable windows shall have locks; provide fiberglass or aluminum insect screens removable from the inside.

5-4.8.1 **Exterior Glass and Glazing**. To comply with force protection minimum standards: Single glazing and the inner pane of insulated glass assemblies in exterior windows and doors shall be minimum 6 mm (1/4-inch) annealed laminated glass.

5-4.9 **Thermal Insulation**. Provide exterior wall, floor, and roof/ceiling assemblies with thermal transmittance (U-values) required to comply with the proposed energy calculations for the facilities. Insulation shall not be installed directly on top of suspended acoustical panel ceilings.

5-4.10 **Exterior Noise Control**. [Add requirements for insulation of exterior walls and roof/ceiling assemblies for attenuation of external noise sources such as airfields].

5-5 **INTERIOR DESIGN**.

5-5.1 **Floors**. Comply with requirements of applicable codes. Non-combustible construction is preferable, even where combustible materials are allowed by code. Floor finish materials shall be as specified in functional and area requirements listed in Chapter 2 of the Statement of Work.

5-5.2 **Ceramic Tile**. Comply with ANSI A 137.1 and the recommendations of Tile Council of America (TCA) Handbook For Ceramic Tile Installation. Provide marble threshold under doors where a ceramic tile floor meets a different floor finish.

5-5.3 **Interior Walls and Partitions**. Comply with requirements of applicable codes. Non-combustible construction is preferable, even where combustible materials are allowed by code. Wall finish materials shall be as specified in functional and area requirements listed in Chapter 2 of the Statement of Work

5-5.3.1 **Metal Support Systems**. Non-load bearing metal studs and furring shall comply with ASTM C 645; stud gauge shall be as required by height and loading, but shall not be less than 25 gauge. Maximum stud spacing: 400 mm [16”] on center. Provide galvanized finish.

5-5.3.2 **Gypsum Board**. Comply with ASTM C 36. Minimum panel thickness: 16 mm [5/8”]. Provide Type X panels in fire-rated assemblies. Provide moisture resistant panels at locations subject to moisture. Provide abuse-resistant panels where indicated in functional and area requirements. Joint treatment: ASTM C 475. Screws ASTM C 646. Drywall installation: ASTM C 840.

5-5.3.3 **Ceramic Tile**. Comply with ANSI A 137.1 and the recommendations of Tile Council of America (TCA) Handbook For Ceramic Tile Installation. Substrate for wall tile shall be mortar setting bed or cement backer board (gypsum board is not acceptable). Provide marble threshold under doors where a ceramic tile floor meets a different floor finish.

5-5.4 **Ceilings**. Comply with requirements of applicable codes. Non-combustible construction is preferable, even where combustible materials are allowed by code. Ceiling finish materials shall be as specified in functional and area requirements listed in Chapter 2 of the Statement of Work.

5-5.5 **Interior Doors and Frames**. Provide hollow metal doors, or flush wood solid core doors at UEPH and administrative spaces. Provide hollow metal doors at COF supply spaces. All frames shall be hollow metal.

5-5.5.1 **Wood Doors**. Provide flush wood solid core doors complying with National Wood Window and Door Association (NWWDA) I.S.-1A. Stile edges shall be non-finger jointed hardwood compatible with face veneer. Provide American Woodwork Institute (AWI) Grade A hardwood face veneer for transparent finished doors; provide AWI Sound Grade hardwood face veneer for painted doors. Transparent finished doors are preferred.

5-5.5.2 **Hollow Metal Doors**. Comply with ANSI A250.8/SDI 100. Doors shall be Level 2, physical performance Level B, Model 2; factory primed. Anchors and accessories shall be zinc

coated. Frames in masonry shall have bituminous back-coating, plaster guards, and shall be grouted solid.

5-5.5.3 **Hollow Metal Frames**. Comply with ANSI A250.8/SDI 100. Frames shall be Level 2, 16 gauge, with continuously welded corners and seamless face joints; factory primed. Anchors and accessories shall be zinc coated. Frames in masonry shall have bituminous back-coating, plaster guards, and shall be grouted solid.

5-5.5.4 **Fire-rated and Smoke Control Doors and Frames**. Comply with International Building Code (IBC), NFPA 80, and requirements of labeling authority. Doors and frames shall bear labels from IBC approved testing laboratory. Comply with positive pressure testing requirements of IBC.

5-5.5.5 **Interior Door Finish Hardware**.

5-5.5.5.1 **Hinges**. ANSI/BHMA A156.1; template, full mortise; heavy duty, ball bearing on doors with closers; standard duty anti-friction bearing on doors without closers. Minimum size 4 ½" x 4 ½ ".

5-5.5.5.2 **Locksets on Living Unit Entry Doors**. ANSI/BHMA A156.13; mortise lockset with removable core; non-ferrous base metal.

5-5.5.5.3 **Locksets on Interior Doors**. ANSI/BHMA A156.2; series 4000, Grade 1, non-ferrous base metal, removable core.

5-5.5.5.4 **Exit (Panic) Devices**. ANSI/BHMA 156.3; heavy-duty touch-pad type, through-bolted mounting. Listed and labeled for panic protection based on UL 305.

5-5.5.5.5 **Closers**. ANSI/BHMA A156.4; series C02000, Grade 1, hydraulic, factory-sized, adjustable to meet field conditions. Provide for all entry doors to living units, all doors opening to corridors and as required by codes.

5-5.5.5.6 **Auxiliary Hardware**. ANSI/BHMA A156.16. Provide wall or floor stops for all doors that do not have overhead holder/stops. Provide other hardware as necessary for a complete installation.

5-5.5.5.7 **Kick Plates**. ANSI/BHMA A156.6; non-ferrous metal. Provide at all doors with closers.

5-5.6 **Limitations on Use, Classification, and Flame Spread and Smoke Developed Ratings of Interior Finishes**. Refer to paragraph 12-6.2.

5-5.7 **Casework**.

5-5.7.1 **Service Areas in Living Units and Coffee Areas in Admin Areas**. Provide manufactured unitized kitchen; or provide architectural cabinets complying with AWI Quality Standards, Section 400, Custom Grade cabinets with high pressure decorative laminate finish, meeting NEMA LD3 standards. Horizontal laminate: nominal .050" thick; vertical laminate: nominal .028" thick. Door and drawer edges shall be heavy duty 3 mm extruded polyvinyl chloride with self-locking serrated tongue. Countertop shall be post-formed high pressure decorative laminate with waterfall front edge and integral coved backsplash, or solid surfacing

material.

5-5.7.2 **Bathroom Vanity in Living Units**. Provide manufactured unitized kitchen, or provide architectural cabinets complying with AWI Quality Standards, Section 400, Custom Grade cabinets with high-pressure decorative laminate finish, meeting NEMA LD3 standards. Horizontal laminate :nominal .048" thick; vertical laminate nominal .028" thick. Door and drawer edges shall be heavy duty 3 mm extruded polyvinyl chloride with self-locking serrated tongue. Vanity countertop shall be post-formed high pressure decorative laminate with waterfall front edge and integral coved backsplash, or solid surfacing material, or cast-filled acrylic with integral lavatory bowl.

5-5.7.3 **UEPH Building CQ Station Reception Desk**. Provide architectural casework complying with AWI Quality Standards, Section 400, Custom Grade cabinets with high pressure decorative laminate finish meeting NEMA LD3 standards. Horizontal laminate: nominal .048" thick; vertical laminate: nominal .028" thick. Door and drawer edges shall be heavy duty 3 mm extruded polyvinyl chloride with self-locking serrated tongue. Worksurfaces and counter shall be high pressure decorative laminate, or solid surfacing material.

5-5.7.4 **Vanity at Public Toilets**. Provide architectural casework complying with AWI Section 400, Custom Grade cabinets with high pressure decorative laminate finish meeting NEMA LD3 standards. Horizontal laminate: :nominal .050" thick; vertical laminate: nominal .028" thick. Provide enclosed wall-hung vanity cabinet with countertop, or wall-hung countertop with apron. Exposed piping at accessible lavatories shall be insulated in conformance with ADA/UFAS. Countertop shall be post-formed high pressure decorative laminate with waterfall front edge and integral coved backsplash, or solid surfacing material.

5-5.7.5 **Other casework**. Provide architectural casework complying with AWI Section 400, Custom Grade cabinets with high pressure decorative laminate finish meeting NEMA LD3 standards. Horizontal laminate: nominal .050" thick; vertical laminate: nominal .028" thick. Door and drawer edges shall be heavy duty 3 mm extruded polyvinyl chloride with self-locking serrated tongue. Worksurfaces and counter shall be high pressure decorative laminate, or solid surfacing material.

5-5.8 **Window Treatments**. Provide horizontal aluminum mini-blinds at all exterior windows, except windows and storefront in corridors and lobbies. Blinds shall have one-inch wide x .008-inch thick slats with anti-static, anti-microbial polyester baked enamel finish. Provide heavy duty 1" x 1-1/2" steel headrail, and tubular steel bottom rail finished to match slats.

5-5.9 **Interior Signage**. Comply with requirements of ADAAG and UFAS. Provide interior room identification signage for the following spaces: Public toilets, [Coordinate with user and installation facilities engineer (DPW). Identify all rooms which require room identification signage; coordinate with the installation interior signage standard, if one exists].

5-5.10 **Elevators**. The offeror shall provide the services of an elevator inspector employed by an independent testing company to inspect the elevator, witness the final testing, and certify elevator. The inspector shall meet all qualification requirements of ASME QEI-1 and shall be certified in accordance with ASME QEI-1. The offeror shall provide an elevator certificate signed by the inspector for each elevator. The certificate shall be provided to the Contracting Officer within 30 days of the completion of testing.

5-6 **PHYSICAL SECURITY REQUIREMENTS**.

5-6.1 **Anti Terrorism / Force Protection**. Comply with the minimum construction standards of the Interim Department of Defense Antiterrorism / Force Protection Construction Standards. [Coordinate with the installation security forces and facilities engineer (DPW) to determine if the minimum standards are adequate for the project location. If a threat analysis has identified a specific threat that requires more stringent measures than provided by the minimum standards, edit the SOW criteria accordingly.] UEPH buildings are classified as troop billeting structures; COFs, Locker Room Facilities, Battalion HQs and Brigade HQs are classified as primary gathering structures

5-6.2 **Arms Vaults at Company Operations Facilities**. Unless more stringent construction features are required by life safety or building codes, minimum construction requirements shall be as follows:

5-6.2.1 **Floor**. 152 mm [6”] slab on grade; reinforced with minimum 152 mm x 152 mm MW 25.8 x MW 25.8 [6 x 6, W2.4 x W2.4] welded wire fabric, on vapor barrier, on 152 mm [6”] deep porous fill.

5-6.2.2 **Walls**. 206 mm [8”] thick cast-in-place concrete reinforced with 15M [#5] bars at 152 mm [6”] on center, each way, each face.

5-6.2.3 **Ceiling**. 206 mm [8”] thick cast-in-place concrete reinforced with 15M [#5] bars at 152 mm [6”] on center, each way, each face.

5-6.2.4 **Door and Frame**. Class 5 vault door and frame complying with Federal Specification AA-D-00600C. Locks shall be Underwriters Laboratory listed Group 1 or 1R combination lock. Provide metal ramp type threshold. Provide wire mesh, dutch door style daygate with shelf for issuing arms and ammo. Daygate shall have lock operated from outside by key, and from inside by handle. Comply with egress requirements of applicable codes.

5-6.2.5 **Penetrations**. Penetrations shall be minimized. All openings or penetrations in Vault floor, walls or ceiling greater than .062 m^2 [96 square inches] shall be protected with welded steel rod-and-bar grid weighing 39.6 kg/m2 [8.1 lb./sf], consisting of 25.4 mm x 4.8 mm [1” x 3/16”] vertical bearing bars at 25 mm [1”] on center, and 8 mm [5/16”] diameter horizontal rods at 50 mm [2”] on center; or equivalent protection.

5-6.2.6 **Arms Rack Anchor Rings**. Provide 10 mm [3/8”] diameter stainless steel bar bent into U-shape (25 mm inside radius) with 2” long 90 degree returns at ends of horizontal legs. Overall length shall be 127 mm [5”]; embed 76 mm [3”] of horizontal legs (open end) in concrete 51 mm [2”] of U-shaped end will protrude from wall to provide anchorage for GFGI arms racks. Orient the projecting U-shape vertically, so that centerline of the U is 4’-0” above the floor slab. Provide anchor rings at 3’-0” on center along all walls inside the Arms Vault [Verify with user].

5-6.3 **Secured Documents Vaults**. Provide 5-sided (walls and ceiling) modular vault attached to building floor system. Vault shall conform to Class M (15 minute working time) requirements of UL 608 Standards for Modular Vault Panels. Vault shall be interfaced with building HVAC, fire protection, and electrical systems. Provide Class 5 vault door and frame complying with Federal Specification AA-D-00600C. Lock shall be Style K, key change combination lock. Provide metal ramp type threshold. Provide wire mesh, daygate with lock operated from outside by key, and from inside by handle. Comply with egress requirements of

applicable codes.

5-6.3.1 **Penetrations**. Penetrations shall be minimized. All openings or penetrations in Vault floor, walls or ceiling greater than .062 m^2 [96 square inches] shall be protected with welded steel rod-and-bar grid weighing 39.6 kg/m2 [8.1 lb./sf], consisting of 25.4 mm x 4.8 mm [1" x 3/16"] vertical bearing bars at 25 mm [1"] on center, and 8 mm [5/16"] diameter horizontal rods at 50 mm [2"] on center; or equivalent protection.

5-6.4 **Floor Anchors for GFGI Security Safes**. Provide 10 mm [3/8"] diameter stainless steel bar bent into U-shape (25 mm inside radius) with 2" long 90 degree returns at ends of vertical legs. Overall height shall be 127 mm [5"]; embed 76 mm [3"] of vertical legs (open end) in concrete floor slab; 51 mm [2"] of U-shaped end will protrude above slab to provide anchorage for GFGI security safe.

CHAPTER 6

STRUCTURAL DESIGN

6-1 **GENERAL**. General: The structural criteria established herein shall be used for structural loading, design and installation of all structural systems and foundations, including manufacturing, erection, supervision, testing, and quality assurance of the completed installation of the buildings. All structural calculations shall be checked and initialed as such by a registered engineer other than the original design engineer. Construction Documents (drawings and specifications) shall be sealed and signed by a Professional Engineer registered and licensed to perform work in the jurisdiction.

6-2 **STRUCTURAL WORK**. The structural work generally consists of, but is not limited to, design and construction of:

6-2.1 Building Foundations. Spread footings, piles, drilled piers or others as required by the geotechnical investigation.

6-2.2 Ground floor slab systems. Slab on grade, pile supported or framed over crawl space as recommended by the geotechnical investigation.

6-2.3 Load Bearing and Nonload Bearing Walls, including masonry, concrete, or stud wall construction acting as primary vertical load carrying members and/or shear walls.

6-2.4 Vertical Framing Members, including steel and concrete columns, masonry pilasters or wood construction.

6-2.5 Horizontal Framing Members, including roof and floor decks and diaphragms, roof and floor beams, joists and trusses.

6-2.6 Interconnection Details, including all fastening requirements.

6-2.7 Special Conditions, such as expansion, construction, and control joints, and changes in floor levels.

6-2.8 Attachment provisions for architectural, mechanical, and electrical elements.

6-2.9 Site structures and foundations.

6-3 **DESIGN CRITERIA**. All structural loads (including dead, live, hydrodynamic, earth, snow, wind, and seismic loads) and design shall be in accordance with the International Building Code (IBC) and all codes referenced therein.

6-3.1 **Minimum Live Load Requirements**:

UEPH Floor	60 Pounds per square foot (psf)
Corridors	80 psf
Stairwells	100 psf
Roof	20 psf

6-3.2 All other building floor live loads shall be in accordance with the International Building Code (IBC).

6-4 **SELECTION OF STRUCTURAL SYSTEMS**. The structural systems shall conform to all applicable criteria and guidance as well as industry standards and commonly accepted methods of practice. Consider logical alternative foundations and framing methods when selecting an appropriate structural system. The following elements shall be evaluated and addressed:

6-4.1 Total Life Cycle cost effectiveness of the system.

6-4.2 Constructability.

6-4.3 Experience level of local contractors and labor force.

6-4.4 Availability and use of local materials.

6-4.5 Sustainable Design.

6-5 **SPECIAL REQUIREMENTS**.

6-5.1 AISC Certification requirements: All fabrication of structural steel shall be accomplished by an AISC certified Category Sbd fabricating plant.

6-5.2 Anti-terrorism Force Protection Systems: Designs shall conform to the DOD Interim Department of Defense Anti-terrorism/ Force Protection Construction Standards. [Design Districts need to indicate the Design Basis Threat here if not classified. If classified, ensure that the offerors will be notified of the minimum requirements.]

CHAPTER 7

THERMAL PERFORMANCE

7-1 **THERMAL CHARACTERISTICS**. Building construction shall conform to the current version of ASHRAE 90.1. All buildings shall be classified as non-residential. R and U values shall be calculated in accordance with ASHRAE methods.

7-2 **THERMAL INSULATION**.

7-2.1 Characteristics. Thermal insulation shall have a flame-spread rating of 25 or less and a smoke-development rating of 50 or less, exclusive of the vapor barrier, when tested in accordance with ASTM E84. A vapor barrier shall be provided on the warm-in-winter side of exterior wall and ceiling insulation, except in humid areas as defined below. Polyurethane is allowed as an insulation material for slabs and outside concrete or unit masonry walls. It is prohibited as an injected insulation material in walls or floor cavities or within the building envelope.

7-3 Humid area design. [Climates which have 3000 hours or more of 19.4 degrees C [67 degrees F] or higher wet bulb temperature in combination with an outside design condition of 50 percent or higher relative humidity, or climates which have 1500 hours or more of 22.8 degrees C [73 degrees F] or higher wet bulb temperature in combination with an outside design condition of 50 percent or higher relative humidity shall be considered humid areas. . In other areas that do not meet the strict definitions of a humid area but experience humid conditions on numerous occasions, these same criteria shall be used by the designer as appropriate for the facility and the climate]. An effective infiltration barrier is critical to limiting moisture flow into occupied spaces. In humid areas, interior surfaces of ceilings and exterior walls shall be covered with materials which allow escape of water vapor from inside the walls into the conditioned space to prevent the growth of mold on interior surfaces. The vapor barrier in humid areas shall have a maximum perm rating of 0.5, and shall be located on the outside face of the exterior wall or ceiling insulation.

7-4 **INFILTRATION**. To limit air infiltration (especially in humid areas), buildings will be sealed with an air infiltration barrier, installed in accordance with the manufacturer's recommendations. The building envelope shall be caulked, gasketed, weatherstripped or otherwise sealed: around window and door frames, between wall cavities and frames, between walls and ceiling and roof, between walls and floors, at access doors and panels, at utility penetrations through walls, floors, and roofs, and at any other exterior envelope joint which may be a source of air leakage. These steps shall constitute tight building construction.

CHAPTER 8

PLUMBING

8-1 **DESIGN STANDARDS AND CODES**. Plumbing system shall be designed and installed in accordance with the latest edition of the International Plumbing Code (IPC). Inspection and testing of the plumbing system shall be performed as prescribed in the International Plumbing Code. Specified materials and equipment shall be standard products of a manufacturer regularly engaged in the manufacturer of such products. Specified equipment shall essentially duplicate equipment that has performed satisfactorily at least two years prior to bid opening.

8-1.1 Additional consideration in the technical evaluation will be given to systems which incorporate measures beyond the requirements of this STATEMENT OF WORK which are designed to increase energy conservation, ease of maintenance, or occupant comfort (such as water filtration and purification), higher efficiency water heating systems, higher grade plumbing fixture materials (such as enameled cast iron tubs as opposed to enameled steel or plastic), etc.

8-1.2 System design and installation must conform to the following mandatory energy and water conservation criteria: Title 10 CFR Part 434.

8-2 **DESIGN CALCULATIONS**.

8-2.1 Hot water heater calculations. Design shall be based on the methods described in the American Society of Plumbing Engineers (ASPE) Volume I, Fundamentals of Plumbing Design. Submit calculations for determining storage capacity and recovery rate. Hot water delivered to toilet facilities shall not exceed 38 C [100 F] ; hot water delivered to showers shall not exceed 44 C [110 F].

8-2.2 Piping. Design shall be based on the International Plumbing Code for domestic water, sanitary waste and vent piping. All water piping shall be sized in accordance with methods outlined in the International Plumbing Code, to limit water velocity in the pipe to 2440 mm/sec [8 ft/sec] unless a lower velocity is recommended by the plumbing fixture manufacturer(s). An isometric diagram of the water system shall be included in the design submittal. An isometric diagram of the sanitary sewer system shall be included in the design submittal.

8-3 **EQUIPMENT**.

8-3.1 Water heaters shall have round, glass lined tanks, and shall be installed with an integral insulating wrap with a minimum R value of 5. Access shall be provided in the wrap for service and maintenance openings. Storage water heaters that are not equipped with integral heat traps and having vertical pipe risers shall be installed with heat traps directly on both the inlet and outlet. Circulating systems need not have heat traps installed. The water heater relief drain shall be manufacturer approved, and shall be indirectly connected to the building sanitary sewer system. Water heaters shall be sized in accordance with paragraph 8-2.1 for a 32 degrees C [90 degrees F] rise. Water heater energy factors shall meet or exceed the minimum requirements of 10 CFR Part 434 and shall be Energy Star or with efficiencies in the upper 25% of what is available. Additional consideration in the technical evaluation will be given to designs which include water heaters which exceed the minimum energy efficiency requirements and which utilize high efficiency, power vented, or sealed combustion water heaters. [Preparer of RFP shall clearly indicate which equipment applies when multiple building types are involved.]

8-3.1.1 Gas fired water heater. Gas fired water heaters shall be in accordance with ANSI Z21.10.1, Water Heaters, Gas, Volume I, Storage Type, 22 kW [75,000 BTUH] Input or less, and shall be sealed combustion high efficiency type. Water heaters with powered ventilation shall be vented in accordance with manufacturer's instructions. Gas fired water heaters shall have annual energy use of 246 therms or less based on 10 CFR Part 434. Units shall be UL listed.

8-3.1.2 Electric water heater. Electric water heaters shall comply with UL 174, Water Heaters, Household Electric Storage Tank Type, and shall have an Annual Energy Use (kWh) of 4,773 or less based on DOE test procedure 10 CFR Part 434. Units shall be UL listed.

8-3.1.3 Oil fired water heater. Oil fired water heaters shall be in accordance with UL 732. Units shall be UL listed.

8-3.1 Pumps. Recirculating pumps shall be inline type and shall be provided whenever hot water piping extends further than 50 feet from a tank.

8-4 **FIXTURES**. The following fixtures will be acceptable for the facilities on this project except where noted otherwise for specific buildings. Provide handicap accessible type as required by Uniform Federal Accessibility Standards (accessible fixtures are not required in UEPH living units). Fixtures shall be water conservation type, in accordance with the International Plumbing Code. Fixtures shall be provided complete with fittings, and chromium- or nickel-plated brass (polished bright or satin surface) trim. All fixtures, fittings, and trim in a project shall be from the same manufacturer and shall have the same finish.

8-4.1 Vitreous china plumbing fixtures shall conform to ANSI A112.19.2, Vitreous China Plumbing Fixtures. Stainless steel fixtures shall be in accordance with ANSI A112.19.3, Stainless Steel Plumbing Fixtures (residential design). Plastic fixtures shall conform to ANSI Z124. Enameled cast iron plumbing fixtures shall comply with ANSI A112.19.1, and enameled steel fixtures shall comply with ANSI A112.19.4.

8-4.2 Exposed traps shall be chromium-plated, adjustable-bent tube, 20-gauge brass. Concealed traps may be plastic (ABS).

8-4.3 Faucets shall be single-control type, with seals and seats combined in one replaceable cartridge designed to be interchangeable among lavatories, bathtubs and kitchen sinks, or having replaceable seals and seats removable either as a seat insert or as a part of a

replaceable valve unit. Water flow shall be no more than .158 L/s [2.5 gpm] from any faucet.

8-4.4 Shower and bath combination shall be controlled by a diverter valve. Baths and shower and bath combinations shall be provided with waste fitting pop-up, concealed with all parts removable and renewable through the overflow and outlet openings in the tub. Showers and shower and bath combinations shall be equipped with a combination valve and flow control device to limit the flow to 0.158 L/s [2.5 gpm] at pressures between 137.9 to 413.7 kPa [20 and 60 psi].

8-4.5 Piping shall be concealed. Individual shutoff or stop valves shall be provided on water supply lines to all plumbing fixtures except bathtubs and showers. Shutoff valves shall be provided for each bathroom group. In multi-story units, additional consideration shall be given in the technical evaluation to designs which provide separate shutoff valves for each floor.

8-4.6 Water closets. Water closets shall have regular bowl with inclined tank, close coupled siphon jet, floor outlet with wax gasket, closed-front seat and cover, and an anti-siphon float valve. Water consumption shall be no more than 6 L [1.6 gal] per complete flushing cycle. Water closet trim shall conform to ANSI A112.19.5, Trim for Water-Closet Bowls, Tanks, and Urinals (Dimensional Standards). Shall be tank type for floor or wall mounted, water saver type and shall meet the requirements of the code.

8-4.7 Urinals. [Shall be flush valve, wall mounted type and shall meet the requirements of the code.] [Urinals shall be wall mounted, waterless type and shall meet the requirements of the code.]

8-4.8 Lavatories. Lavatories shall be rectangular counter top type, minimum 508 by 457 mm [20 by 18 inches] in size or oval minimum 480 by 410 mm [19 by 16 inches] in size. Lavatories shall be vitreous china, cast iron rimless type (without rings), or cross-link acrylic molded counter top with integral bowl. Lavatories shall have pop-up drains. Shall meet the requirements of the code.

8-4.9 Bathtubs. Bathtubs shall be slip resistant and shall be constructed of enameled cast iron, porcelain enameled formed steel, or gel-coated, glass fiber reinforced polyester resin with wainscot. Metal bathtubs shall have fiberglass, porcelain-on-steel panels, or ceramic tile wainscot. Shall meet the requirements of the code.

8-4.10 Showers. Shower stalls shall be of ceramic tile, floor to ceiling, over membrane waterproofing on a cementitious substrate; or gel-coated, glass-fiber reinforced polyester. Shower receptors shall be slip resistant cast stone or gel-coated, glass-fiber-reinforced polyester. Shower stall wainscots shall be ceramic tile or gel-coated, glass-fiber-reinforced polyester. Shall be fiberglass enclosure type.

8-4.11 Kitchen sinks. Kitchen sinks shall be Type 302 stainless steel, 20-gauge minimum, seamless drawn, and sound deadened. Sinks shall be single bowl, self-mounting without mounting rings, complete with cup strainer and plug. Food waste disposers, where provided, shall be in accordance with UL 430 and ASSE 1008, and shall have a minimum motor size of 370 watts [½ horse power]. Strainer and plug shall be eliminated where food waste disposers are provided. Shall meet the requirements of the code.

8-4.12 Service sinks. Shall meet the requirements of the code.

8-4.13 Electric water coolers. Units shall be electric refrigerated type and shall conform to the requirements of ARI 1010 and the Lead Contamination Control Act of 1988.

8-5 **PIPING SYSTEMS**. Piping shall be concealed. Individual shutoff or stop valves shall be provided on water supply lines to all plumbing fixtures except bathtubs and showers. Shutoff valves shall be provided for each bathroom group. In multi-story units, additional consideration shall be given in the technical evaluation to designs which provide separate shutoff valves for each floor or as required to facilitate servicing in the interest of minimizing down time and interruption of service. Provide cathodic protection and pipe joint bonding systems as required.

8-5.1 Gas. The design and installation of natural gas distribution systems and equipment shall be in conformance with manufacturer's recommendations and applicable sections of ASME B31.8 and AGA-01. The installation of interior natural gas distribution systems shall be in conformance with the provisions of NFPA 54 and AGA-01. The use of semi-rigid tubing and flexible connectors for gas equipment and appliances is prohibited, except that the final connections to the kitchen ranges shall be made using flexible connectors conforming to ANSI Z21.45, Flexible Connectors of Other Than All Metal Construction for Gas Appliances, not less than 1000 mm [40 inches] long. Provide accessible gas shutoff valve and coupling for each gas equipment item. Comply with UBC or model code seismic requirements. Exposed horizontal piping shall not be installed farther than 150 mm [6 inches] from the nearest parallel wall in laundry areas or areas where clothes hanging could be attempted.

8-5.2 Domestic water piping. Piping and fittings shall be copper tubing or chlorinated polyvinyl chloride (CPVC) plastic pipe. Valves shall be provided at each fixture and piece of equipment, at each toilet and kitchen, and on takeoffs from risers to each floor. Under slab supply piping shall be limited to service entrance only.

8-5.2.1 Copper tubing. Water piping under concrete slabs shall be copper tubing, type K, annealed. Joints under the slabs are prohibited. If copper tubing is selected for interior water piping, it shall be type K, L, or M hard-drawn copper. Type M copper tubing shall not be installed in exposed areas where the tubing may be exposed to external damage. Additional consideration in the technical evaluation shall be given to designs using copper types K or L. Fittings for soft copper tubing shall conform to ANSI B16.26, Cast Copper Alloy Fittings for Flared Copper Tubes, and for hard-drawn to ANSI B16.22, Wrought Copper and Copper alloy Solder Joint Pressure Fittings.

8-5.2.2 Chlorinated Polyvinyl Chloride (CPVC) Plastic Pipe. [Determine the acceptability of CPVC and edit text as required.] If plastic pipe is selected for interior water piping, it shall be Chlorinated Polyvinyl Chloride (CPVC) plastic pipe, conforming to ASTM D-2846, Standard Specification for Chlorinated Poly(Vinyl Chloride) (CPVC) Hot- and Cold-Water Distribution Systems. CPVC thicknesses shall meet Standard Design Ratio 11 for sizes 13-mm [½-inch] to 51 mm [2 inches] and shall be schedule 80 pipe for sizes larger than 51 mm [2 inches].

8-5.2.3 Soil, waste, vent, and drain. Piping and fittings shall be cast iron, copper or polyvinyl chloride (PVC) plastic pipe. Cleanouts shall be provided as required by the code.

8-6 **MISCELLANEOUS ITEMS**.

8-6.1 Cleanouts. Cleanouts shall be provided at each change in direction of sanitary sewer lines, at the intervals specified in the National Standard Plumbing Code, and at the building service entrance. All cleanouts shall be permanently accessible. Ground cleanouts shall be

installed in a 300-mm by 300-mm [12-inch by 12-inch] concrete pad, flush with grade. Wall and floor types shall be provided as required by the code. Provide access panels or cover plates in exposed areas.

8-6.2 Hose bibbs. Hose bibbs shall be provided at the front and rear of each building, for each ground level housing unit. Hose bibbs shall be frostproof, and shall be supplied with an integral vacuum breaker. Provide as required by the code.

8-6.3 Wall hydrants. Provide every 150 feet along the perimeter of the building.

8-6.4 Backflow preventers. Provide as required by the code.

8-6.5 Washer wall boxes. Clothes Washer Connections at each washer location. Drainage and hot and cold water supply shall be provided for automatic clothes washers. Washer connection, complete with 50-mm [2-inch] drain, 20-mm [3/4-inch] hose thread supplies shall be provided in standard manufactured recessed wall box with single-face plate. Boxes shall be constructed of plastic or sheet steel. Steel boxes shall have a corrosion-resistant epoxy enamel finish. Boxes shall be mounted a minimum of 865 mm [2 ft-10 inches] above the finish floor. Electrical outlets for both washer and dryer shall also be provided.

8-7 **PIPE INSULATION.** Insulation type shall be fiberglass, closed cell foam, or phenolic foam.

8-7.1 Domestic service hot water piping. Minimum pipe insulation performance shall be in accordance with the requirements of the latest edition of ASHRAE/IESNA 09.1.

8-7.2 Domestic service cold water piping shall be insulated with a minimum of 13-mm [½-inch] insulation with vapor jacket

8-7.3 Roof drain piping. Provide 25-mm [1-inch] thickness insulation on all horizontal piping.

CHAPTER 9

ELECTRICAL SYSTEMS

9-1 **DESIGN STANDARDS AND CODES**. The electrical design for all facilities shall be in accordance with the current version of the National Electrical Code.

9-2 **DESIGN CALCULATIONS**. Provide calculations for the following:

9-2.1 Interior lighting. Provide calculations for each room or area.

9-2.2 Exterior lighting. Provide calculations for all site lighting to include parking areas, walkways, roadways and security.

9-2.3 Load Analysis for each building to include connected and estimated demand. Separate loads by categories such as lighting, receptacles, HVAC, special equipment, etc.

9-2.4 Fault – short circuit calculations for electrical system(s).

9-2.5 Voltage drop – Provide calculations to verify voltage drops. Do not exceed limits as given in the National Electric code (NEC).

9-2.6 Coordination – provide data to verify proper protection and coordination is provided for the equipment/system(s).

9-3 **MATERIALS AND EQUIPMENT**. All materials and equipment shall be the standard catalogued products of manufacturers regularly engaged in the production of such equipment and material, and shall be the manufacturer's latest design. All equipment and material shall conform to the requirements of American National Standards Institute (ANSI), American Society of Testing and Materials (ASTM), National Electrical Manufacturer's Association (NEMA), National Fire Protection Association (NFPA) or other national trade association as applicable. Where standards exist, materials and equipment shall bear the label and be listed by Underwriters Laboratories, Inc. (UL) or other recognized testing organization.

9-3.1 Space requirements. Electrical space shall be provided for all electrical equipment. Space shall provide clearances and working areas as required by codes. Coordinate location to consider factors such as ease of maintenance, vicinity to loads being served and accessibility.

9-3.2 Wiring. Shall be copper and shall be run in conduit. Use solid bare copper wire for sizes No. 8 AWG and smaller diameter, and Class B, stranded bare copper wire for sizes No. 6 AWG and larger diameter.

9-3.3 Motors. Motors shall be high energy efficient type. Motors larger than one-third horse power shall be three phase. Motors one-third horsepower and smaller shall be single phase. Motor starters for mechanical and special equipment will be furnished as an integral part of the mechanical or special systems.

9-3.3.1 Motor Efficiencies. Minimum motor efficiencies shall be either Energy Star or in accordance with DOE Buying Energy Efficient Products Recommendations (refer to www.eren.doe.gov/femp/procurement for recommended efficiencies). Applications which require definite purpose, special purpose, special frame, or special mounted polyphase induction

motors are excluded from these efficiency requirements. Motors provided as an integral part of motor driven equipment are excluded from this requirement if a minimum seasonal or overall efficiency requirement is indicated for that equipment by the provisions of another section.

9-3.4 Switchboard/panelboard. Dead-front construction, NEMA PB1 and UL 67.

9-4 **LIGHTING**.

9-4.1 Interior. Lighting shall conform to Illumination Engineering Society (IES) recommended levels and in general shall be energy efficient fluorescent with electronic ballast. Lighting in occupied areas shall be color corrected with a Color Rendering Index (CRI) of 85 or better. For energy conservation dual switch, automatic dimming, or occupancy sensors shall be considered. [Design District may review http://www.energystar.gov/products/ for additional information.]

9-4.2 Exterior. Site and area lighting shall be high intensity discharge (HID).

9-5 **TELECOMMUNICATIONS**. [Design District shall coordinate all RFP communications requirements with the user, the Installation DOIM and USAISEC-FDEO. Define general requirements by reference to the EIA/TIA standards. Coordinate with DOIM and USAISEC-FDEO to determine if specific project requirements may be included by reference to the "Installation Information Infrastructure Architecture (I3A) Design and Implementation Guide," and add other specific requirements as necessary to fully define the scope of communications requirements prior to issuance of the RFP. If reference is made to the I3A document, include it in the list of references in Appendix A to the SOW.] Cable and jacks shall be Category 5E per EIA/TIA 568A, Commercial Building Telecommunications Cabling Standard. Provide wiring from outlet jack to termination on applicable PATCH-PANEL. Follow requirements of ANSI/TIA/EIA-569-A for telecommunications closets and equipment rooms. [For specialized circuits, such as pay phones, coordinate with the local telephone company. Provide electrical and telephone outlets installed per the Americans with Disabilities Act (ADA) to accommodate TTD's and other devices.] When systems furniture is installed as part of the construction contract, insure that systems furniture specifications include ANSI/TIA/EIA-568-A and ANSI/TIA/EIA-569-A cabling and raceway standards. Use fiber optic cable for backbone data service [Unless expanding an existing site where other backbone cable types are required or requested by user. Coordinate with DOIM and USAISEC-FDEO].

9-5.1 Telecommunication outlet locations. [Coordinate with users and list general and specific locations of telephone and data outlets.] In UEPH buildings provide a minimum of one combination telephone/data outlets in each Living/Sleeping room. Coordinate outlet locations with furniture arrangement.

9-6 **SECURITY SYSTEM(S)**. [Design District shall determine requirements for security systems.]

9-7 **SPECIAL SYSTEMS**. [Design District shall determine requirements for special systems.]

9-8 **CABLE TELEVISION (CATV) SYSTEM**. [Edit if CATV system is not to be included in project, or if master antenna system will be used in lieu of CATV] Refer to the "Installation Information Infrastructure Architecture (I3A) Design and Implementation Guide". Provide TV outlets in the UEPH buildings per guide requirements, except provide minimum of one CATV

outlet in each Living/Sleeping room. In COF, Battalion HQ, and Brigade HQ provide CATV outlets in the following locations: [Coordinate with user].

CHAPTER 10

UNIT DESIGN - HEATING, VENTILATING, AND AIR CONDITIONING

[Delete all references to comfort cooling where air conditioning is not authorized. Delete references to inapplicable systems throughout the following paragraphs.]

10-1 **DESIGN STANDARDS AND CODES**. The HVAC design shall be in accordance with 10 CFR Part 434 and the current version of the International Mechanical Code.

10-1.1.1 **DESIGN CALCULATIONS**.

10-1.2 Heat loss[and heat gain] calculations. Heating[and cooling] loads shall be in accordance with the current edition of the ASHRAE Handbook of Fundamentals. Computer-generated load calculations shall be provided, and shall include complete input and output summaries. Equipment shall be sized to meet the total load determined by computer calculation. Equipment may be oversized to no more than 115 percent of the computer generated load. Design shall be based on weather data from the Air Force Combat Climatology Center, http//www.afccc.af.mil; from ASHRAE Handbook of Fundamentals; or from other recognized and authoritative sources of weather data. Room air flow requirements shall be computed based on the individual room load. Values for internal cooling loads shall be included in the computerized load calculations in accordance with ASHRAE recommendations. Minimum space heating and ventilation shall be provided in spaces normally unoccupied, such as bulk storage and equipment rooms.

TABLE 10-1 – WEATHER DATA

Type of Design /Design Information	Metric	Inch/pound
Heating		
Indoor Design Temperature	21 °C	70 °F
Unoccupied Space Design Temperature	13 °C	55 °F
Outdoor Design Temperature	Note1	Note1
Annual Heating Degree Days	Note1	Note1
Largest Number of Monthly Heating Degree Days	Note1	Note1
Cooling		
Indoor Design Temperature	24 °C	75 °F
Outdoor Design Dry Bulb Temperature	Note1	Note1
Outdoor Design Wet Bulb Temperature	Note1	Note1

Metric data are based on Celsius degree days to a base of 18° C. Inch-pound data are based on degree days Fahrenheit to a base of 65° F.

[Insert weather data for the specific location involved1. A table with bin weather data shall also be provided after this table if heat pumps are a selected alternative.]

10-2.1.1 Load design criteria –UEPH Facilities (Barracks): The internal loads shown in Table 10-2 shall be included for each space listed. The degree of activity for all people shall be moderately active office work. Lights shall be included for the actual quantity provided. Any additional equipment furnished under this contract shall also be included in the appropriate space.

TABLE 10-2 – INTERNAL LOADS

Space	People	Equipment
Sleeping/Living Room	1	1 PC, 1 TV
Kitchen	0	1 Refrigerator
Bathroom	0	None

10-2.1.2 Load design criteria – Company Operations Facilities. The internal loads shown in Table 10-3 shall be included for each space listed. The degree of activity for all people shall be moderately active office work. Lights shall be included for the actual quantity provided. Any additional equipment furnished under this contract shall also be included in the appropriate space.

TABLE 10-3 – INTERNAL LOADS

Space	People	Equipment
Office	1 / 142 sf	1 PC/ person
Conference Room	1 / 20 sf	1 PC
Lobby	1 / 33 sf	1 Coffee Pot
Activities Room	1 / 20 sf	1 PC
Mail Room	1 / 100 sf	None
TV Lounge	1 / 20 sf	1 TV
Kitchen	1 / 100 sf	1 KW
Toilet, Janitor Closet	0	None
Corridor/Balcony/Vending	1 / 300 sf	None
Laundry	0	None

10-2.1.3 Load design criteria – Battalion/Brigade Operations Facilities. The internal loads shown in Table 10-4 shall be included for each space listed. The degree of activity for all people shall be moderately active office work. Lights shall be included for the actual quantity provided. Any additional equipment furnished under this contract shall also be included in the appropriate space.

TABLE 10-4 – INTERNAL LOADS

Space	People	Equipment
Offices	1 / 142 sf	1 PC/person
Conference Room	1 / 20 sf	1 PC
Lobby	1 / 33 sf	Coffee Pot
Classroom	1 / 20 sf	1 PC/person
Toilet, Janitor Closet	0	None
Corridor	1 / 300 sf	None

10-2.2 Ventilation air. Calculations determining minimum outside ventilation air and exhaust shall be provided for each building space. Ventilation rates shall be in accordance with the current edition of the International Mechanical Code. Outside air quantities will be sufficient to meet ventilation requirements and maintain a positive pressure relative to the outdoors in the living/sleeping rooms, interior corridors, offices, conference rooms, lobby and similar occupied areas.

10-2.3 Piping calculations. Calculations shall be provided for pressure drop calculations for all piping systems, including head loss calculations for all pumps.

10-2.4 Duct calculations. Calculations shall be provided for sizing all duct systems, including static pressure drop calculations for all fans. Ductwork layout drawings shall also be provided to indicate all fittings and devices to substantiate calculations.

10-3 **HUMID AREA DESIGN**. [Climates which have 3000 hours or more of 19.4 degrees C [67 degrees F] or higher wet bulb temperature in combination with an outside design condition of 50 percent or higher relative humidity, or climates which have 1500 hours or more of 22.8 degrees C [73 degrees F] or higher wet bulb temperature in combination with an outside design condition of 50 percent or higher relative humidity shall be considered humid areas. In other areas that do not meet the strict definitions of a humid area but experience humid conditions on numerous occasions, these same criteria shall be used by the designer as appropriate for the facility and the climate.] In humid areas, all air heating and cooling systems shall be provided, and economizer cycles will not be allowed. Closet and storage spaces shall have louvered doors, and building return air shall be drawn through these spaces to a ducted return air system. Cooling coils shall have a maximum of 315 fins/m [8 fins/inch] to allow for easy cleaning, and shall be sized for a maximum face velocity of 2.8 m/s [550 fps] to preclude moisture carryover. Heating and cooling equipment in humid areas shall be designed to meet the load determined by computer calculation. However, a larger fan may be required to meet minimum air flow requirements than would be anticipated based on the computer load. Equipment may be oversized by no more than 15 percent of the computer generated sensible load.

10-3.1 Load calculations. The one percent wet bulb temperature, from the approved weather data source of 10-1.2 above, will be used in calculating the latent cooling load and for

equipment sizing. In addition to calculating the cooling load at maximum design temperature, cooling load calculations or thermal simulations should also be made at maximum dew point temperatures or for low temperature, high humidity conditions to determine the greatest dehumidification load that may be encountered. Latent heat gain due to water vapor flow through roofs and walls will be included in the cooling load analysis when the ambient design dew point exceeds the room design dew point by more than 11.1 degrees C [20 degrees F].

10-3.2 Chilled water systems. The cooling capacity of 350 kW [100 tons] and over systems will be divided between two or more chillers to ensure reliability and constant chilled water supply without temperature fluctuations, to prevent short cycling, and to minimize hot gas by-pass. The combined capacity of the chillers will not exceed the total requirement, including diversity. The selection of the number of chillers will be based on the analysis of part load operating hours for extended periods of low load conditions.

10-3.3 Packaged units. Packaged unitary units with multiple reciprocating compressors (not to exceed eight) will be used for systems between 123 kW and 750 kW [35 tons to 200 tons]. Each compressor will have separate, independent, refrigerant circuits and cycles to provide multiple steps of capacity control. Two compressors may be combined into one independent refrigerant circuit. For systems up to 123 kW (35 tons), single compressors with a minimum of three-step capacity unloading may be used.

10-3.4 Outside air. Where the outside air requirements are a significant part of the cooling load, especially in UEPH buildings where a separate outside air unit is required, the use of desiccant cooling, enthalpy wheels and similar devices for conditioning the outside air and transferring latent and sensible heat to the exhaust air shall be considered. If appropriately sized, these units can eliminate or minimize the latent load in the conditioned space saving significant energy and greatly increasing the comfort level.

10-4 **MECHANICAL SYSTEMS**. Each building shall be provided with a [central] heating [and air conditioning] system[s]. Systems shall be designed, installed, balanced, and adjusted to distribute heat [and cooling] to all habitable rooms, as well as bathrooms, in proportion to the calculated load requirements of these spaces. [The District in close coordination with the installation shall determine the allowable system types and fuel options to be used. Also coordinate unit locations with installation facilities engineering personnel (DPW). Most installations prefer that fan coils and similar units for UEPH modules not be ceiling mounted if located in the living/sleeping room or the service area; floor mounted units or vertical units are often preferred for ease of maintenance and minimization of water damage if condensate drains get plugged. Select a system type below or provide a description of other acceptable systems as an additional subparagraph. All reasonably equivalent fuel options within a range of 10 percent based on life cycle cost analysis shall be allowed. The Design District may assist the Installation in preparation of the fuel life cycle cost comparison.] UEPH buildings shall be limited to individual heat pumps, fan coils, or similar units with individual adjustable thermostat and fan switch in each space (sleeping room, not module). A central preconditioned outside air system, supplying neutral air (at or near room temperature) ducted to each occupied space (living/sleeping room), shall also be provided for UEPH buildings. The quantity of total treated outside air to each module shall be sufficient to satisfy required ventilation rates and to maintain each space at a positive pressure with respect to the outside. The outside air quantity for each module shall be determined with the toilet exhaust fan in operation but without the range hood or dryer exhaust in operation. Additional consideration in the technical evaluation will be given to systems utilizing energy efficient equipment, additional space in the mechanical room, and other features which contribute to ease of system operation and maintenance. Additional

consideration will also be given to designs which provide measures to increase energy conservation or occupant comfort such as division of each unit into more than one conditioning zone for increased control.

[Edit the following list as applicable for the particular project. If not acceptable, insert "... (Deleted)" following subparagraph letter and delete remainder of text. If a system type is acceptable for one facility but not for the others, note what exceptions are not allowed after the subparagraph title. If the desired system type is different than what is described, modify the description as required for the particular system desired or provide additional paragraphs as necessary. Preparer of RFP shall get approval from installation for each system used.]

10-4.1 Incremental equipment. [Provide individual thru-wall self-contained air-to air heat pumps for each sleeping room and individual space that is to be conditioned.] [Provide individual thru-wall packaged terminal air conditioning units for each sleeping room and individual space that is to be conditioned.] [Fan coil units with hydronic heating [and cooling] shall be provided for each sleeping room and individual space that is to be conditioned.]

10-4.2 Air distribution systems. Heating [and cooling] will be provided from [rooftop air handling units] [central air handling units] [warm air furnaces] [fan coil units]. [Air handling units shall deliver air to [variable air volume boxes in] [dual duct boxes in] [induction units in] each space.]]. [Designate a maximum area served per individual unit or a maximum unit size.]

10-4.3 Hydronic distribution systems. Provide pumped [condenser water] [hot water] [and] [chilled water] piping system[s] with a standby pump provided for each system pump provided. Chilled water will be provided from [central system] [central equipment indicated]. Hot water will be provided from [central hot water system] [central steam system and convertor] [central equipment indicated]. Condenser water will be from [ground source heat pump system] [central equipment indicated]

10-4.4 Ground source heat pump systems. Provide a ground source heat pump system with water source heat pumps. System design shall be in accordance with IGSHPA standards. Supplemental heating and cooling source shall be as indicated. [Designate a maximum area served per individual unit or maximum unit size.]

10-4.5 Heating only systems. For spaces where heating only is required, provide [unit heaters], [fin tube radiation], [cabinet heaters] or [convectors]. Units shall be [hydronic] [electric] [gas fired].

10-4.6 Central heating equipment. Provide [gas fired hot water boiler] [oil fired hot water boiler] [dual fuel gas/oil fired hot water boiler]. [Designate if multiple units are required.]

10-4.7 Central cooling equipment. Provide [packaged air cooled chiller] [water cooled chiller with cooling tower] [water cooled chiller with evaporative cooler] for cooling. [Designate if multiple units are required.]

10-4.8 Exhaust systems. Provide [individual ceiling mounted fans for][central building continuous exhaust systems for] toilet exhausts. [Central continuous toilet exhaust is normally preferred for barracks.] Provide [individual ceiling mounted fans for][central building exhaust systems for] general exhaust systems. Provide individual thermostatically controlled exhaust fans for laundries, mechanical/electrical rooms and other spaces where ventilation only is required. [Provide recirculating type exhaust hoods for all residential type ranges and cooking

surfaces.] [Provide exhaust hoods individually and directly ducted to the exterior through a wall louver for all residential type ranges and cooking surfaces.]

10-5 **INCREMENTAL EQUIPMENT**. The following equipment will be acceptable for the facilities on this project except where noted otherwise for specific buildings. Minimum equipment efficiencies shall be in accordance with DOE Buying Energy Efficient Products Recommendations (refer to www.eren.doe.gov/femp/procurement for recommended efficiencies) or Energy Star.

10-5.1 Packaged air conditioning units. Unit shall be a through-the-wall mounted, heavy-duty commercial grade, factory assembled and precharged air-conditioner [heat pump] unit. Unit shall be in accordance with ARI 310/380 and UL 1995. Units shall be removable from inside the building for servicing without removing the outside cabinet. Louver shall be stormproof type, constructed of anodized, stamped or extruded aluminum. Controls shall include an on-off switch, multiple speed fan mode and an adjustable [cooling and] heating thermostat. Outside air can not be supplied through unit. Function and temperature controls shall be [integral to unit][remote mounted].

10-5.2 Air-to-air heat pump units. Unit shall be a through-the-wall mounted, heavy-duty commercial grade, factory assembled and precharged heat pump unit. Unit shall be in accordance with ARI 310/380 and UL 1995. Units shall be removable from inside the building for servicing without removing the outside cabinet. Louver shall be stormproof type, constructed of anodized, stamped or extruded aluminum. Sleeve shall be a water and airtight [completely insulated] [noninsulated] assembly, with weather-resistant protective coating. Units shall contain a reversing valve to change unit to heating cycle. An outdoor coil temperature sensor shall be provided to guard against coil freeze-up by either switching to supplemental heat only, or by cycling the compressor to defrost the coil. Controls shall include an on-off switch, multiple speed fan mode and an adjustable [cooling and] heating thermostat. Outside air can not be supplied through unit. Function and temperature controls shall be [integral to unit][remote mounted].

10-5.3 Water source heat pumps. Units shall be horizontal or vertical type with easily accessible filters. Controls shall include an on-off switch, multiple speed fan mode and an adjustable [cooling and] heating thermostat. Outside air cannot be supplied through the unit.

10-5.4 Evaporative coolers. [Evaporative coolers shall be considered only at installations which traditionally use evaporative cooling, and comfort conditions can be maintained through their use. Determine whether evaporative coolers will be allowed as a design option to the offeror.] Units shall be self-contained, single stage, weather- resistant type, and shall conform to UL 507 and UL 746C. The fan shall be centrifugal type and shall be complete with motor, drive equipment, and vibration-isolation supports between motor and fan housing on single phase motors. Water distributor or rotary wheel motor shall be provided with a time delay in the fan circuit to allow media to be thoroughly wetted before air flow starts. Manual or automatic reset type thermal overload protection shall be provided. Evaporative cooler fans shall have air delivery ratings based on AMCA 210 tests by an AMCA approved laboratory. An ultraviolet retarding agent shall be part of or applied on exterior nonmetallic components susceptible to ultraviolet degradation from sun rays and conforming to UL 746C. Evaporative media shall be specifically manufactured for use with evaporative coolers. Media shall be honeycombed type, fabricated such that no moisture entrainment shall occur. Face velocities shall be limited to those recommended by media manufacturer. Indirect coolers shall consist of an air-to-air heat exchanger, water distribution header, scavenger fan and motor, recirculating water pump, supplemental cooling coil (as required), drain, overflow and makeup water lines and an

accessible damper to allow change-over from heating to cooling. Cooler shall be drainable, and shall be provided with a mounting frame.

10-5.5 Unit heaters. Units shall be horizontal or vertical air discharge types complete with fans, [electric] [hot water] [steam] coils, housing and discharge vanes or diffuser.

10-5.6 Fin tube radiation. Units shall be complete with [electric] [plate fin] heating elements and enclosures. Enclosures shall be constructed of sheet steel not less than 20 gauge.

10-5.7 Cabinet heater. Units shall be complete with fans, heating elements and enclosing cabinets. Heating elements shall be constructed of cast iron or of nonferrous material. Cabinets shall be constructed of sheet steel not less than 20 gauge.

10-5.8 Convectors. Units shall be complete with heating elements and enclosing cabinets having bottom recirculating opening, manual control damper and top supply grille. Heating elements shall be constructed of cast iron or of nonferrous alloys. Cabinets shall be constructed of black sheet steel not less than 20 gauge.

10-6 **AIR DISTRIBUTION TERMINAL UNITS**. Minimum equipment efficiencies shall be in accordance with DOE Buying Energy Efficient Products Recommendations (refer to www.eren.doe.gov/femp/procurement for recommended efficiencies) or Energy Star.

10-6.1 Fan coil units. Base units shall include galvanized coil casing, coil assembly drain pan valve and piping package, air filter, fans, motor, fan drive, and motor switch, plus an enclosure for cabinet models and casing for concealed models. Outside air can not be supplied directly through unit. Room fan-coil units shall be certified as complying with ARI 440, and shall meet the requirements of UL 1995. Enclosures shall be fabricated of not lighter than 18 gauge steel, reinforced and braced. Front panels of enclosures shall be removable and provided with 1/2 inch thick dual density fibrous glass insulation. Access doors or removable panels shall be provided for piping and control compartments. Duct discharge collar shall be provided for concealed models. Enclosures shall have easy access for filter replacement. Fans shall be galvanized steel or aluminum, multiblade, centrifugal type. Disassembly and re-assembly shall be by means of mechanical fastening devices and not by epoxies or cements. Coils shall seamless copper tubing, with copper or aluminum fins mechanically bonded or soldered to the tubes. Drain and drip pans shall be sized and located to collect all water condensed on and dripping from any item within the unit enclosure or casing. Drain pans shall be constructed of not lighter than 21 gauge steel, galvanized after fabrication, thermally insulated to prevent condensation. Auxiliary drain pans to catch drips from control and piping packages, eliminating insulation of the packages, may be plastic; if metal, the auxiliary pans shall comply with the requirements specified above. Insulation at control and piping connections thereto shall extend 1 inch minimum over the auxiliary drain pan. Filters shall be of the fiberglass disposable type, 1 inch thick. Filters in each unit shall be removable without the use of tools. Motors shall be of the permanent split-capacitor type with built-in thermal overload protection, directly connected to unit fans. Motor switch shall be two or three speeds. In lieu of the above fan speed control, a solid-state variable-speed controller having a minimum speed reduction of 50 percent may be provided. Motors shall have permanently-lubricated or oilable sleeve-type or combination ball and sleeve-type bearings with vibration isolating mountings suitable for continuous duty.

10-6.2 Variable air volume terminal unit. Units shall be pressure independent type. Unit enclosures shall be constructed of galvanized steel not lighter than 22 gauge or aluminum sheet not lighter than 18 gauge. Units shall be internally insulated with factory mounted controls. Unit

air volume shall be factory preset and readily field adjustable without special tools. Heating coils shall be provided. Filters shall be provided when air is recirculated. Acoustic performance of the terminal units shall be based upon units tested according to ARI 880. Acoustical lining shall be according to NFPA 90A.

10-6.2.1 Constant volume type. Terminal units shall contain within the casing, a mechanical or pneumatic constant volume regulator. Volume regulators shall control air delivery to within plus or minus 5 percent of specified air flow subjected to inlet pressure from 3/4 to 6 inch water gauge.

10-6.2.2 Variable volume type. Terminal units shall be provided with a calibrated air volume sensing device, air valve or damper, actuator, and accessory relays. Units shall control air volume to within plus or minus 5 percent of each air set point volume as determined by the thermostat with variations in inlet pressures from 3/4 to 6 inch water gauge. Internal resistance of units shall not exceed 0.4 inch water gauge at maximum flow range. External differential pressure taps separate from the control pressure taps shall be provided for air flow measurement with a 0 to 1 inch water gauge range. Unit volume controller shall be normally [open] [closed] upon loss of pneumatic pressure.

10-6.2.3 Fan-powered type. Terminal units shall be provided with a calibrated air volume sensing device, air valve or damper, actuator, fan and motor, and accessory relays. Units shall control primary air volume to within plus or minus 5 percent of each air set point as determined by the thermostat with variations in inlet pressure from 3/4 to 6 inch water gauge. Unit fan shall be centrifugal, direct-driven, double-inlet type with forward curved blades. Fan motor shall be either single speed with speed controller or three-speed, permanently lubricated, permanent split-capacitor type. Fan/motor assembly shall be isolated from the casing to minimize vibration transmission. Fan control shall be factory furnished and wired into the unit control system. A factory-mounted pressure switch shall be furnished to operate the unit fan whenever pressure exists at the unit primary air inlet or when the control system fan operates.

10-6.3 Dual duct terminal unit. Unit enclosures shall be constructed of galvanized steel not lighter than 22 gauge or aluminum sheet not lighter than 18 gauge. Units shall be internally insulated with factory mounted controls. Units shall be provided with hot and cold inlet valve or dampers. Dampers shall be controlled in unison by single or dual actuators. Unit shall control delivered air volumes within plus or minus 5 percent with inlet air variations from 1 to 8 inch water gauge in either duct. Mixing baffles shall be included with the unit casing. Cabinet and closed duct leakage shall not exceed 2 percent of maximum rated air volume. Unit air volume shall be factory preset and readily field adjustable without special tools. Acoustic performance of the terminal units shall be based upon units tested according to ARI 880. Acoustical lining shall be according to NFPA 90A.

10-6.4 Unit ventilators. Unit ventilators shall be of the year-round classroom type with automatic controls arranged to properly heat, cool, and ventilate the room. Automatic valves and controls shall be provided. Enclosures shall be fabricated of not lighter than 16 gauge galvanized steel, reinforced and braced, or all welded framework with panels to provide equivalent strength. The casing shall be acoustically and thermally insulated internally with not less than 1/2 inch thick dual density fibrous glass insulation. Removable panels or access doors shall be provided for all piping and control compartments. Gaskets shall be provided at the back and bottom of the unit for effective air seal, as required. Fans shall be of galvanized steel or aluminum, multiblade, centrifugal type, direct connected, dynamically and statically balanced.

Drain and drip pans shall be sized and located to collect all condensed water dripping from any item within the unit enclosure. An outside air proportioning damper shall be provided on each unit. In addition, a vane shall be provided to prevent excessive outside air from entering unit and to prevent blow-through of outside air through the return air grille under high wind pressures. Where outside air and recirculated air proportioning dampers are provided on the unit, an additional vane will not be required. Face and bypass dampers shall be provided for each unit to ensure constant air volume at all positions of the dampers. Each unit shall be provided with a factory installed control cam assembly, pneumatic motor, or electric motor to operate the face and bypass dampers and outside air damper or outside air and recirculated air dampers. Motors shall be of the permanent split-capacitor type with built-in thermal overload protection and automatic reset. Motor shall be mounted on a resilient mounting, isolated from the casing and shall be suitable for operation on electric service available. A manually operated motor switch shall provide for 2 or 3 speeds. In lieu of speed control, a solid state variable speed controller having minimum speed reduction of 50 percent may be provided. Outside air intakes shall be the manufacturer's standard design and provided with 12 mm [1/2 inch] mesh bird screen or louvers on 12 mm [1/2 inch] centers.

10-6.5 Induction units. Unit shall include air plenums, air-discharge nozzles, air discharge grilles, recirculation grilles, water coil assembly, valve and piping package, condensate drain pan, filters and adjustable air-balancing dampers, plus an enclosure for cabinet models and casing for concealed models. Automatic valves and controls shall be provided. Each unit shall be secured to the building structure. The induction units shall conform to the provisions of ARI 445. Enclosures shall be fabricated of not lighter than 18 gauge steel, reinforced and braced. Front panel of enclosure shall be removable and insulated when required acoustically and to prevent condensation. Plastic discharge and return grilles are not acceptable. Access doors shall be provided for all piping and control compartments. An adjustable air-balancing damper shall be provided in each unit. Drain and drip pans shall be sized and located to collect condensed water dripping from any item within the unit enclosure. Drain pans shall be constructed of not lighter than 21 gauge steel, galvanized after fabrication, and thermally insulated to prevent condensation.

10-6.6 Exhaust fans. Fans shall be centrifugal [or propellar] type, roof or wall mounted, direct or V-belt driven with backward inclined, non-overloading wheel. Motor compartment housing shall be hinged or removable and weatherproof, constructed of heavy gauge aluminum. Fans shall be provided with birdscreen, disconnect switch, gravity or motorized dampers. Roof mounted units shall be provided with roof curb. Lubricated bearings shall be provided. Fans shall be tested and rated according to AMCA 210. [Grease-laden kitchen exhaust fans shall be centrifugal type according to UL 705 and fitted with V-belt drive, round hood, and windband upblast discharge configuration, integral residue trough and collection device, motor and power transmission components located in outside positively air ventilated compartment.]

10-6.7 In-line fans. Fans shall have centrifugal, backward inclined blades, stationary discharge conversion vanes, internal and external belt guards, and adjustable motor mounts. Fans shall be mounted in a welded tubular casing. Air shall enter and leave the fan axially. Inlets shall be streamlined with conversion vanes to eliminate turbulence and provide smooth discharge air flow. Fan bearings and drive shafts shall be enclosed and isolated from the air stream. Fan bearings shall be sealed against dust and dirt and shall be permanently lubricated, and shall be precision self aligning ball or roller type. Fans shall be tested and rated according to AMCA 210.

10-6.8 Ceiling exhaust fans. Suspended cabinet-type ceiling exhaust fans shall be

centrifugal type, direct-driven. Fans shall have acoustically insulated housing. Integral backdraft damper shall be chatter-proof. The integral face grille shall be of egg-crate design or louver design. Fan motors shall be mounted on vibration isolators. Unit shall be provided with mounting flange for hanging unit from above. Fans shall be U.L. listed.

10-6.9 Range hoods. Kitchen range exhaust fans shall be two-speed, and shall be sized for an exhaust rate of 7.6 (L/s)/m2 [1.5 cfm/ ft2]. Maximum allowable noise level shall be 6 sones as installed.

10-6.10 Dryer Vents. A 100 mm [4-inch] diameter dryer vent shall individually and directly discharge to the exterior. The vents shall be rigid aluminum with exterior wall cap and backdraft damper. Vent pipes shall be a maximum of 600 mm [20 ft] long, with no more than three right angle elbows (with minimum radius of 150 mm [6 inches]), and have a maximum vertical run of 3660 mm [12 ft]. Means shall be provided for cleaning entire length of dryer vents. Dryer vents shall not exhaust near air conditioning condensing units, entry doors, patio or balconies. Dryer vents shall not run through non-accessible spaces.

10-7 **AIR DISTRIBUTION CENTRAL EQUIPMENT**. Minimum equipment efficiencies shall be in accordance with DOE Buying Energy Efficient Products Recommendations (refer to www.eren.doe.gov/femp/procurement for recommended efficiencies) or Energy Star.

10-7.1 Air handling units. Units shall include fans, coils, airtight insulated casing, adjustable V-belt drives, belt guards for externally mounted motors, access sections for maintenance, combination sectional filter-mixing box, vibration-isolators, and appurtenances required for required operation. Air handling unit shall have published ratings based on tests performed according to ARI 430. All sections shall be constructed of a minimum 18 gauge galvanized steel, or 18 gauge steel outer casing protected with a corrosion resistant paint finish. Casing shall be designed and constructed with an integral structural steel frame such that exterior panels are non-load bearing. Casings shall be provided with inspection doors, access sections, and access doors. Inspection and access doors shall be insulated, fully gasketed, double-wall type, of a minimum 18 gauge outer and 20 gauge inner panels. Drain pans shall be constructed water tight, treated to prevent corrosion, and designed for positive condensate drainage. Coils shall be fin-and-tube type constructed of seamless [copper] [red brass] tubes and [aluminum] [or] [copper] fins mechanically bonded or soldered to the tubes. Coils shall be rated and certified according to ARI 410. Filters shall be listed according to requirements of UL 900. Filters shall be 50 mm [2] inch depth, sectional, disposable type of the size indicated and shall have an average efficiency of 25 to 30 percent when tested according to ASHRAE 52.1. Filters shall be UL Class 2. Fans shall be double-inlet, centrifugal type with each fan in a separate scroll. Fan bearings shall be sealed against dust and dirt and shall be precision self-aligning ball or roller type. Bearing life shall be L50 rated at not less than 200,000 hours as defined by AFBMA Std 9 and AFBMA Std 11. Bearings shall be permanently lubricated or lubricated type with lubrication fittings readily accessible at the drive side of the unit.

10-7.2 Rooftop air handling units shall not be used.

10-7.3 Warm air furnaces. Furnace shall be a manufacturer's standard, self-contained, forced circulated air heating type furnace. Furnace and furnace components shall be completely factory-assembled and wired. Furnace casing shall be factory insulated and be compatible with the operating temperatures. Furnace shall be provided with removable service panels which allow access to all internal components requiring cleaning, servicing, or adjustment.

10-7.3.1 Gas-fired furnace. Shall be the [conventional] [high efficiency, condensing] type in accordance with **ANSI Z21.47**. Furnace design shall be certified by the AMERICAN GAS ASSOCIATION LABORATORIES (AGA). Gas-burning equipment shall include the gas burners, ignition equipment, gas-control valve, gas piping, gas-pressure regulating valve, when applicable, and accessories necessary for a fully automatic system that is listed in **IAS Directory**. Gas-fired units equipped with programming controls shall be furnished both with high and with low gas supply pressure switches in the fuel supply piping. Ignition systems shall be of the direct spark, hot surface, or interrupted intermittent type with automatic electric ignition. The pilots shall be of the electrically-ignited proven type. Continuous pilots will not be permitted. Burner shall be designed in accordance with **NFPA 54** and located so that parts are protected against overheating. Provisions shall be made in the burner housing for inspection of the pilot flame. Vent piping shall be in accordance with **UL 441**, [Type B] [Type BW]. Vent shall conform to **NFPA 211** and **NFPA 54**. Plastic materials polyetherimide (PEI) and polyethersulfone (PES) are forbidden to be used for vent piping of combustion gases. [Direct venting shall be used for high efficiency, condensing type furnaces. Both the air intake and exhaust vents shall be sized and located as recommended by the furnace manufacturer. A separate combustion air intake vent and exhaust shall be provided for each furnace. The combustion air intake piping shall be constructed of Schedule 40 PVC in accordance with **ASTM D 1784**. The exhaust vent piping shall be constructed of Schedule 40 CPVC or stainless steel in accordance with **UL 1738** and the furnace manufacturer's recommendations.]

10-7.3.2 Oil-fired furnace. Shall be in accordance with **UL**. The equipment shall include the oil burner motor, ignition equipment safety devices, and accessories necessary for a full automatic system that conforms to UL 296. Oil-fired units equipped with programming controls shall be furnished with low oil-pressure switches in the fuel supply piping. Oil-fired units not equipped with programming controls shall be equipped with a delayed opening or shutoff valve. The valve shall automatically delay delivery of oil to the burner until such time as the combustion air fan and, when applicable, the induced draft fan are operated at rated speed. Ignition systems shall be of the [direct-electrical spark type] [direct-electric spark type or interrupted type] in accordance with UL 296. Vent piping shall be in accordance with UL 641, Type L. Vent shall conform to NFPA 211. Plastic materials polyetherimide (PEI) and polyethersulfone (PES) are forbidden to be used for vent piping of combustion gases.

10-8 **CENTRAL HEATING EQUIPMENT**. Minimum equipment efficiencies shall be in accordance with DOE Buying Energy Efficient Products Recommendations (refer to www.eren.doe.gov/femp/procurement for recommended efficiencies) or Energy Star.

10-8.1 Hot water boilers, gas fired. Boilers shall be gas fired and shall be designed, constructed and equipped in accordance with the ASME Boiler Pressure Vessel Code, Section IV, Heating Boilers. Each boiler shall be of the [firetube] [watertube] [cast iron] [condensing] type. The boiler capacity shall be based on the ratings shown in HYI-01 or as certified by the American Boiler Manufacturers Association, or American Gas Association. Boiler shall be designed to burn [gas] [oil] [combination gas and oil]. Each boiler shall comply with Federal, state, and local emission regulations. Burners shall be UL approved [mechanical draft burners

with all air necessary for combustion supplied by a blower where the operation is coordinated with the burner] [natural draft/atmospheric burners]. Burners shall be provided complete with fuel supply system in conformance with UL 795, ANSI Z21.13 or NFPA 8501.

10-8.2 Hot water boilers, oil fired. Boilers shall be gas fired and shall be designed, constructed and equipped in accordance with the ASME Boiler Pressure Vessel Code, Section IV, Heating Boilers. Each boiler shall be of the [firetube] [watertube] [cast iron] type. The boiler capacity shall be based on the ratings shown in HYI-01 or as certified by the American Boiler Manufacturers Association. Boiler shall be designed to burn [gas] [oil] [combination gas and oil]. Each boiler shall comply with Federal, state, and local emission regulations. Oil-fired burners and controls for oil-fired units firing No. 2 oil shall be atomizing, forced-draft type in conformance with UL 726.

10-8.3 Hot water boilers, dual fuel fired. Boilers shall be gas fired and oil fired. Boilers shall be designed, constructed and equipped in accordance with the ASME Boiler Pressure Vessel Code, Section IV, Heating Boilers. Each boiler shall be of the [firetube] [watertube] [cast iron] type. The boiler capacity shall be based on the ratings shown in HYI-01 or as certified by the American Boiler Manufacturers Association, or American Gas Association. Boiler shall be designed to burn gas and oil. Each boiler shall comply with Federal, state, and local emission regulations. Combination gas and oil-fired units shall conform to UL 296. Burner shall be provided complete with fuel supply system in conformance with ASME CSD-1 or NFPA 8501.

10-8.4 Steam converter. Exchangers shall operate with steam in shell and low temperature water in tubes. Shell and tube sides shall be designed for 150 psig working pressure and factory tested at 300 psig. Steam, water, condensate, and vacuum and pressure relief valve connections shall be located in accordance with the manufacturer's standard practice. Tubes shall be seamless copper or copper alloy, constructed in accordance with ASTM B 75 or ASTM B 395, ASTM B 395M, suitable for the temperatures and pressures specified.

10-9 **CENTRAL COOLING EQUIPMENT**. Minimum equipment efficiencies shall be Energy Star or in accordance with the following minimum efficiencies:

Minimum Efficiencies for Air-Cooled Chillers

	Full Load		IPLV	
	COP	(EER)	COP	(kW/ton)
Air-Cooled (with Condenser):				
527 kW (150 tons) or less	2.8	(9.5)	3.1	(1.12)
greater than 527 kW (150 tons)	2.7	(9.2)	2.9	(1.22)
Air-Cooled (Condenserless):				
All Capacities	3.1	(10.6)	3.2	(1.10)

Minimum Efficiencies for Water-Cooled Chillers

	Full Load		IPLV	
Capacity	COP	(EER)	COP	(kW/ton)

281 kW (80 tons) or less	3.9	(13.3)	4.7	(0.75)
greater than 281 kw (80 tons) or less than or equal to 351 kw (100 tons)	3.9	(13.3)	5.1	(0.70)
greater than 351 kw (100 tons) or less than or equal to 702 kw (200 tons)	4.7	(16.0)	5.4	(0.65)
greater than 702 kw (200 tons) or less than or equal to 1757 kw (500 tons)	5.7	(19.4)	6.1	(0.58)
greater than 1757 kw (500 tons)	5.9	(20.0)	6.3	(0.56)

10-9.1 Packaged air cooled liquid chillers. Units shall be assembled, leak-tested, charged (refrigerant and oil), and adjusted at the factory. Chiller shall be provided with factory installed insulation on surfaces subject to sweating including the liquid cooler, suction line piping, economizer, and cooling lines. Chiller shall include all customary auxiliaries deemed necessary by the manufacturer for safe, controlled, automatic operation of the equipment. Chiller shall be provided with a single point wiring connection for incoming power supply. Factory installed insulation shall be provided on all suction piping from the evaporator to the compressor and on the liquid cooler shell. Where motors are the gas-cooled type, factory installed insulation shall be provided on the cold-gas inlet connection to the motor per manufacturer's standard practice. Compressors shall be scroll, reciprocating, rotary screw or centrifugal type. Scroll and reciprocating chillers shall be constructed and rated in accordance with ARI 590. Rotary screw chillers shall be constructed and rated in accordance with ARI 550 or ARI 590 as applicable. Centrifugal chillers shall be constructed and rated in accordance with ARI 550. Chiller shall conform to ASHRAE 15. Refrigerants shall be one of the fluorocarbon gases. Refrigerants shall have number designations and safety classifications in accordance with ASHRAE 34. Refrigerants shall meet the requirements of ARI 700 as a minimum. Refrigerants shall have an Ozone Depletion Potential (ODP) of less than or equal to 0.05. Chiller shall be provided with a complete factory mounted and prewired [electric] [microprocessor based control system]. Controls package shall contain as a minimum a digital display or acceptable gauges, an on-auto-off switch, motor starters, power wiring, control wiring, and disconnect switches. Controls package shall provide operating controls, monitoring capabilities, programmable setpoints, safety controls, and EMCS interfaces.

10-9.2 Water cooled liquid chillers. Total chiller system shall be constructed and rated in accordance with ARI 590. Individual chiller components shall be constructed and rated in accordance with the applicable ARI standards. Chiller shall be assembled, leak-tested, charged (refrigerant and oil), and adjusted at the job site by a factory representative. Unit components delivered separately shall be sealed and charged with a nitrogen holding charge. Unit assembly shall be completed in strict accordance with manufacturer's recommendations. Chiller shall operate within capacity range and speed recommended by the manufacturer. Parts weighing 50 pounds or more which must be removed for inspection, cleaning, or repair, shall have lifting eyes or lugs. Chiller components (excluding field installed refrigerant piping) shall be provided with factory installed insulation on surfaces subject to sweating. Chiller shall include all

customary auxiliaries deemed necessary by the manufacturer for safe, controlled, automatic operation of the equipment. Refrigerants shall be one of the fluorocarbon gases. Refrigerants shall have number designations and safety classifications in accordance with ASHRAE 34. Refrigerants shall meet the requirements of ARI 700 as a minimum. Refrigerants shall have an Ozone Depletion Potential (ODP) of less than or equal to 0.05. Chiller shall be provided with a complete factory mounted and prewired [electric] [microprocessor based control system]. Controls package shall contain as a minimum a digital display or acceptable gauges, an on-auto-off switch, motor starters, power wiring, control wiring, and disconnect switches. Controls package shall provide operating controls, monitoring capabilities, programmable setpoints, safety controls, and EMCS interfaces.

10-9.3 Absorption Liquid Chiller. Chiller shall be constructed and rated in accordance with ARI 560 and shall bear the appropriate underwriter's laboratories (UL) label. Chiller shall be the [single-stage] [two-stage] hermetic, water-cooled type design. Chiller shall be [indirectly-fired with [steam] [hot water]] [directly-fired with a [single] [dual] fuel burner]. [For direct-fired units, ratings for cooling capacity, fuel consumption, and COP shall be based on the higher heating value (HHV) or the specific type of fuel utilized.] Unless necessary for delivery purposes, chiller shall be assembled, leak-tested, charged, and adjusted at the factory. In lieu of delivery constraints, a chiller may be assembled, leak-tested, charged, and adjusted at the job site by a factory representative. Unit components delivered separately shall be sealed and charged with a nitrogen holding charge. Unit assembly shall be completed in strict accordance with manufacturer's recommendations. Chiller shall operate within capacity range and speed recommended by the manufacturer. Chiller shall be provided with factory installed insulation on surfaces subject to sweating including the liquid cooler and water boxes. Chiller shall be provided from the factory with a single point wiring connection for incoming power supply. Magnetic across-the-line motor starters with overload protection shall be provided for each factory supplied pump. Chiller shall include all customary auxiliaries deemed necessary by the manufacturer for safe, controlled, automatic operation of the equipment. Evaporator, absorber, condenser, generator(s), and heat exchanger(s) shall be of the shell-and-tube type construction and be in accordance with ASME BPV VIII Div 1. Chiller shall be provided with a forced draft, flame retention type burner and fuel train assembly. Burner shall be the [single] [dual] fuel type capable of burning [natural gas] [propane] [and] [number 1 fuel oil] [number 2 fuel oil] [diesel]. Burner and fuel train shall be listed by the underwriters laboratories (UL). Chiller shall be provided with a complete factory mounted and prewired [electric] [microprocessor based control system]. Controls package shall contain as a minimum a digital display or acceptable gauges, an on-auto-off switch, motor starters, power wiring, control wiring, and disconnect switches. Controls package shall provide operating controls, monitoring capabilities, programmable setpoints, safety controls, and control system interfaces.

10-9.4 Cooling towers. Each tower shall be the [induced] [forced] mechanical draft, [crossflow] [or] [counterflow], factory fabricated, factory-assembled type. Towers shall conform to NFPA 214. Fire hazard rating for plastic impregnated materials shall not exceed 25. Plastics shall not drip or run during combustion. Determine ratings by ASTM E 84 or NFPA 255. Casing shall be constructed Type 304 stainless steel or FRP. Basin shall be completely watertight and constructed of Type 304 stainless steel or FRP. The fill shall be [PVC formed sheets arranged in a honeycomb or waveform configuration] [or] [treated Douglas-fir, hemlock or redwood]. Fill shall be removable or otherwise made accessible for cleaning. Provide space supports as required to prevent sagging and misalignment, and provide for an even mixing of air and water. Structural supports shall be provided in accordance with the recommendations of the manufacturer of the tower unless otherwise indicated. Water distribution systems shall be accessible and permit flexibility of operation. Systems shall be self-draining and nonclogging.

Provide drift eliminators in tower outlet to limit drift loss to not over 0.02 percent of specified water flow. Fans shall be the [centrifugal] [or] [adjustable-pitch propeller] type, constructed of Type 304 stainless steel, aluminum or an aluminum alloy, or FRP.

10-9.5 Closed circuit coolers. Casing shall be constructed of hot-dip galvanized steel with fan section constructed of stainless steel. Coil and frame shall be steel and hot-dip galvanized after fabrication. Access doors or panels suitably sized and located shall be provided for access for cleaning, repair, or removal. Provide discharge damper controls to minimize heat loss during reduced operation and electric heater in sump for freeze protection.

10-9.6 Evaporative condensers. Condenser shall be rated and tested in accordance with requirements of ASHRAE 64. Condenser shall include fans, water pump with suction strainer, electric motor and drive equipment, water eliminators if required, condensing coil, liquid receiver if required, water pan or sump, spray nozzles or water-distribution pan, water strainer, water make-up assembly, bleeder with flow valve of the needle valve type sized for the flow required or a fixed orifice, enclosure with suitable access doors, and air-inlet and outlet openings. No water shall carry over into the unit discharge outlet. Enclosure shall be constructed of [18 gauge hot-dip galvanized steel] [aluminum], reinforced and braced. Access doors or panels suitably sized and located shall be provided for access to water nozzles or distribution pan, coils, and valves for cleaning, repair, or removal of the item.

10-9.7 [Manufacturer’s multiyear compressor warranty. The Contractor shall provide a [5] [10] year [parts only (excludes refrigerant)][parts and labor (includes refrigerant)] manufacturer's warranty on the chiller compressor(s). This warranty shall be directly from the chiller manufacturer to the Government and shall be in addition to the standard one-year warranty of construction. The manufacturer's warranty shall provide for the repair or replacement of the chiller compressor(s) that become inoperative as a result of defects in material or workmanship within [5] [10] years after the date of final acceptance. When the manufacturer determines that a compressor requires replacement, the manufacturer shall furnish new compressor(s) at no additional cost to the Government. Upon notification that a chiller compressor has failed under the terms of the warranty, the manufacturer shall respond in no more than [6] [24] [_____] hours. Response shall mean having a manufacturer-qualified technician onsite to evaluate the extent of the needed repairs. The warranty period shall begin on the same date as final acceptance and shall continue for the full product warranty period.]

10-10 **AIR DISTRIBUTION SYSTEMS**. Provide duct systems conforming to the recommendations of the SMACNA Duct Construction Standards including seal class requirements. Fire dampers shall be provided where required by code. Balancing dampers shall be provided at all branch takeoffs and for all supply outlets. Permanent access to dampers shall be provided.

10-10.1 Ductwork. All ductwork designated to be constructed at a duct pressure class of 3-inch water gauge or greater shall be pressure tested. Any device (filter, fan, coil or other component) in the air supply, return or exhaust system that will normally operate at these pressures shall be included in the test. The maximum allowable leakage rate shall be in accordance with the SMACNA Leakage Test Manual for the Leakage Class (C) associated with the duct Seal Class. Test procedure, apparatus, and report shall conform to SMACNA. The leakage test shall be satisfactorily completed prior to applying the external duct insulation.

10-10.2 Supply diffusers and registers. Diffusers shall be located to ensure that the air distribution will completely cover all surfaces of exterior walls with a blanket of conditioned air or

may be of a compact design so long as 'dead spots' within the units are avoided. At least one diffuser shall be provided in each habitable room. Diffusers shall be provided with integral opposed blade damper. Diffusers shall be provided with air deflectors as required for proper air flow in the space. Plastic diffusers are prohibited. Core velocity shall be limited to 3 m/sec [600 fpm] maximum, with a maximum pressure drop of 0.82 Pa/m [0.1 inch water]. Airflow from any single diffuser shall be limited to 94.4 L/s [200 cfm] maximum. Ceiling mounted units shall have factory finish to match ceiling color, and be installed with rims tight against ceiling. Sponge-rubber gaskets shall be provided between ceiling or wall and surface-mounted diffusers for air leakage control. Diffuser boots shall be sealed tight to the wall or ceiling they penetrate using duct mastic or caulking. Suitable trim shall be provided for flush- mounted diffusers. Duct collar connecting the duct to diffuser shall be airtight and shall not interfere with volume controller. Wall supply registers shall be installed at least 150 mm [6 inches] below the ceiling.

10-10.3 Return/exhaust registers and grilles. Grilles shall be fixed horizontal or vertical louver type similar in appearance to the supply diffuser face. Registers shall be provided with integral opposed blade damper. Plastic units are prohibited. Core velocity shall be limited to 2 m/sec [400 fpm] maximum, with a maximum pressure drop of 0.5 Pa/m [0.06 inch water]. Grilles shall be provided with sponge-rubber gasket between flanges and wall or ceiling. Register/grille boots shall be sealed tight to the wall or ceiling they penetrate using duct mastic or caulking. Wall return grilles shall be located at least 150 mm [6 inches] above the floor or below the ceiling.

10-10.4 Flexible duct. Shall be limited to runouts, shall be adequately supported to prevent kinks and shall not exceed 3.2 m [10 feet] in length. Runouts shall be preinsulated, factory fabricated, and conform with NFPA 90 and UL 181.

10-10.5 Fire dampers: Fire dampers shall be located and installed in accordance with NFPA 90A requirements, and shall be labeled in accordance with UL standard 555. Fire dampers shall be Dynamic Rated for closure against airflow in the following six installation configurations:

a. Vertical Mount (horizontal airflow) – Ducted and unducted
b. Horizontal Mount (airflow up) – Ducted and unducted
c. Horizontal Mount (airflow down) – Ducted and unducted

Fire damper shall be rated to close against maximum design airflow at its installed location with a 10 percent safety factor and against 8 inches water gauge maximum pressure across the closed damper. If wall, floor, or partition has a fire resistance rating of 3 hours or more, the fire damper shall have a UL 555 fire rating of 3 hours. All other fire damper shall have a UL 555 fire rating of 1½ hours. Fire dampers shall be equipped with a steel sleeve or adequately sized frame and installed such that the operation of the damper will not be impaired. Fire dampers shall not reduce the cross section area of duct or air transfer openings. Duct access doors shall be provided at all fire dampers. Design shall address access to the dampers located above ceiling, etc.

10-10.6 Balancing dampers. Provide in ducts serving each supply, return and exhaust air device.

10-10.7 Access doors. Provide in ductwork and plenums at all air flow measuring devices, automatic dampers, fire dampers, coils, thermostats and other devices requiring service and inspection.

10-11 **HYDRONIC DISTRIBUTION SYSTEMS**.

10-11.1 Pumps. Provide [inline] [basemounted] centrifugal pump for each hydronic system provided. Provide flexible connections and pressure gauges on pump inlet and outlet. [Provide primary and backup pump for each hydronic system provided.]

10-11.2 Air separator. Provide air separator for each closed hydronic system provided.

10-11.3 Expansion. Provide a [bladder tank] [expansion tank] for each closed hydronic system provided.

10-11.4 Chemical feed systems. Provide means for chemical treatment for each hydronic system provided. Provide automatic chemical treatment systems for all open water systems. Provide initial treatment and one year supply of chemicals for each system provided.

10-11.5 Makeup water. Provide backflow preventers and pressure reducing valves on each makeup water system provided. Each hydronic system shall have a separate pressure reducing valve.

10-12 **PIPING SYSTEMS**. Piping systems shall be in accordance with the following subparagraphs. Fittings and valves shall be compatible for the piping systems in which installed. Provide dielectric unions where required. Provide flexible connections where necessary to prevent vibrations from transmitting from equipment to the piping system. Expansion loops, expansion joints and offsets shall provide with adequate anchors and guides where required to prevent excessive forces within the piping systems. All piping shall be properly and adequately supported. Pipe supports shall conform to MSS SP-58 and MSS SP-69.

10-12.1 Chilled water. Shall be steel piping conforming to ASTM A 53/A 53M, Grade A or B, black steel, schedule 40 or copper tubing conforming to ASTM B 88, ASTM B 88M, Type K or L.

10-12.2 Hot water. Shall be steel piping conforming to ASTM A 53/A 53M, Type E or S, Grade A or B, black steel, schedule 40 or copper tubing conforming to ASTM B 88, ASTM B 88M, Type K or L.

10-12.3 Refrigerant. Copper tubing shall conform to ASTM B 280 annealed or hard drawn as required. Copper tubing shall be soft annealed where bending is required and hard drawn where no bending is required. Soft annealed copper tubing shall not be used in sizes larger than 35 mm [1-3/8 inches]. Refrigerant piping, valves, fittings, and accessories shall conform to the requirements of ASHRAE 15.

10-12.4 Steam. Shall be steel piping conforming to ASTM A 53/A 53 M, Type E or S, Grade A, black steel, schedule 40.

10-12.5 Steam condensate. Shall be steel piping conforming to ASTM A 53/A 53 M, Type E or S, Grade A, black steel, schedule 80.

10-12.6 Condensate drain. Shall be copper tubing or PVC pipe.

10-13 INSULATION. Pipe and duct insulation shall be in accordance with ASHRAE 90.1. Equipment insulation shall be a minimum of 50 mm [2 inch] thickness or as necessary to prevent the surface temperature from exceeding 60 degrees C [140 degrees F]. Thermal

insulation on piping, fittings, ductwork, equipment and vessels shall be installed per the "National Commercial & Industrial Insulation Standards" (MICA) Manual. The sample specification format in Section VI of the MICA manual shall be used and edited to suit the work to be performed. Insulation of all equipment, piping, etc subject to operating at or below 50 degrees F shall be provided with closed-cell insulation.

10-13.1 Duct insulation. Provide on the exterior of all supply and outside air ducts and plenums and on all return ducts in unconditioned spaces. Exhaust ductwork does not require insulation. Internally lined ductwork shall not be allowed. Insulation shall be faced with a vapor barrier material having a performance rating not to exceed 1.0 perm. Insulation, vapor barrier, and closure systems shall be non-combustible as defined in NFPA 255, with a flame-spread rating of not more than 25, and a smoke development rating of not more than 50, as defined in ASTM E-84. Where insulated ducts pass through fire walls, fire partitions, above grade floors, and fire rated chase walls, the penetration shall be sealed with fire stopping materials.

10-13.2 Pipe. Provide on all aboveground hot and cold piping systems except PVC condensate drains. Insulation shall form a continuous thermal retarder and shall have a vapor retardant to prevent condensation on cold piping systems. Installation shall be with full length units of insulation and using a single cut piece to complete a run. Cut pieces or scraps abutting each other shall not be used. Supply the insulation with manufacturers recommended factory applied jacket except for flexible cellular. Piping exposed to weather shall be insulated and an aluminum jacket or PVC jacket shall be applied. Where insulated pipes pass through fire walls, fire partitions, above grade floors, and fire rated chase walls, the penetration shall be sealed with fire stopping materials.

10-13.2.1 Cold aboveground piping. Insulation for minus 34.5 degrees to plus 15.6 degrees C [minus 30 degrees to plus 60 degrees F] for outdoor, indoor, exposed or concealed applications, shall be as follows:

10-13.2.1.1 Cellular Glass: ASTM C 552, Type II, and Type III.

10-13.2.1.2 Flexible Cellular Insulation: ASTM C 534, Type I or II with vapor retarder skin on both sides.

10-13.2.1.3 Phenolic Insulation: ASTM C 1126, Type III.

10-13.2.1.4 Polyisocyanurate Insulation: ASTM C 591, Type I.

10-13.2.1.5 Hot aboveground piping. Insulation for above 15.6 degrees C [60 degrees F] for outdoor, indoor, exposed or concealed applications, shall be as follows:

10-13.2.2.1 Mineral Fiber: ASTM C 547, Types I, II or III.

10-13.2.2.2 Calcium Silicate: ASTM C 533, Type I indoor only, or outdoors above 121 degrees C [250 degrees F] pipe temperature.

10-13.2.2.3 Cellular Glass: ASTM C 552, Type II and Type III.

10-13.2.2.4 Flexible Cellular Insulation: ASTM C 534, Type I or II to 93 degrees C [200 degrees F] service.

10-13.2.2.5 Phenolic Insulation: ASTM C 1126 Type III to 121 degrees C [250 degrees F] service shall comply with ASTM C 795.

10-13.2.2.6 Polyisocyanurate Insulation: ASTM C 591, Type 1, to 149 degrees C [300 degrees F] service.

10-13.3 Equipment. Provide on all equipment when temperatures are below 16 degrees C [60 degrees F], above 40 degrees C [104 degrees F] or where condensation can occur. Insulation shall be suitable for the temperature encountered. Insulation shall be formed or fabricated to fit the equipment. Removable insulation sections shall be provided to cover parts of equipment which must be opened periodically for maintenance including vessel covers, fasteners, flanges and accessories. Supply the insulation with manufacturer's recommended factory applied jacket.

10-14 **CONTROLS**. Control system shall be [DDC] [or] [electric]. Pneumatic actuators for automatic valves, dampers and similar will be allowed. Provide all devices required, including air compressors, refrigerated dryers, current transducers, transformers, thermostats, sensors, controllers, actuators, control valves, dampers, transmitters, flow meters, etc., to provide a complete and operable system. All thermostats for systems that provide both heating and cooling shall have a deadband of 2.8 degrees C [5 degrees F]. All equipment and systems shall be automatically controlled [and monitored] by the control system. [The control system shall tie into the existing [EMCS] [UMCS] system.] [A description of the existing system shall be provided by the design agent.] Control system instructions shall be provided for each system. The instructions shall consist of half-size laminated drawings and shall include the control system schematic, equipment schedule, ladder diagram, sequence of operation, panel arrangement drawings, wiring diagram, and valve and damper schedules.

10-15 **TESTING, ADJUSTING AND BALANCING**. Testing, adjusting and balancing of each system shall be the Contractor's responsibility. Testing and balancing of air and hydronic suystems shall be accomplished by a firm certified for testing and balancing by the Associated Air Balance Council (AABC) or National Environmental Balancing Bureau (NEBB). The TAB contractor shall be an independent firm (not financially associated with any of the subcontractors on this project) hired by the prime contractor. The TAB firm shall additionally perform the following:

a. Final design review (report provided to COR) of HVAC construction documents to insure the HVAC design provides the proper quantity and location of balancing devices and test ports necessary for accurate TAB results.

b. Prior to start of TAB effort the installed systems shall be inspected (report provided to COR) by the TAB firm to insure the system components, which affect the TAB effort, are properly installed and functioning. TAB shall not begin until the TAB firm’s final report indicates all necessary corrective actions have been accomplished.

Testing of individual items of equipment shall be performed by a person authorized to perform such tesing and startup by the equipment manufacturer. The contractor shall correct all systems and equipment not found in compliance, and shall be responsible for all labor and materials required for this effort. AABC MN-1or NEBB-01 shall be used as the standard for providing testing of air and water systems. The selected standard shall be used throughout the entire project. All recommendations and suggested practices contained in the selected standard shall be considered mandatory. Instrumentation accuracy shall be in accordance with selected standard. The provisions of the TAB standard, including checklists, report forms, etc., shall, as nearly as practical, be used to satisfy the Contract requirements.

10-15.2 Piping systems. Each piping system including pipe, valves, fittings and equipment shall be hydrostatically tested and proved tight at a pressure of 1-1/2 times the design working pressure, but not less than 699 kPa [100 psi] for a period of not less than two hours with no appreciable loss in pressure. Piping shall not be insulated until testing is completed and acceptable. Upon completion of installation and prior to startup, each hydronic system shall be balanced. All balancing data, including deficiencies encountered and corrective action taken, shall be recorded. Following final acceptance of certified reports by the Contracting Officer, the setting of all HVAC adjustment devices shall be permanently marked by the Contractor's balancing engineer so that adjustment can be restored if disturbed at any time.

10-15.3 Air systems. Where specific systems require special or additional procedures for testing, such procedures shall be in accordance with the standard selected. All data, including deficiencies encountered and corrective action taken, shall be recorded. Following final acceptance of certified reports by the Contracting Officer, the setting of all HVAC adjustment devices shall be permanently marked by the Contractor's balancing engineer so that adjustment can be restored if disturbed at any time.

10-15.4 Equipment. Each item of central operating equipment provided, including boilers, [air handling units,] [ ] and chillers shall be tested in accordance with the equipment manufacturer’s standard testing procedures. A factory representative shall be present for the startup and testing of each item of equipment. A certified report shall be provided for each item of equipment tested.

10-16 **COMMISSIONING**. All HVAC systems and equipment including controls shall be commissioned in accordance with the following Clauses 5 (Program-Phase Procedure), 6 (Design Phase), 7 (Construction Phase), 8 (Acceptance Phase) and 12 (Commissioning Documentation) in ASHRAE Guideline 1. The Commissioning Authority (CA), referenced in ASHRAE Guideline 1, shall be hired by the prime Contractor. The CA shall be completely independent from the Contractor and shall not be a Contractor’s employee or be an employee or principal of a firm in a business relationship with the Contractor negating such independent status. The roles and responsibilities of the CA are defined in Annex A DIVISION 15 PART 1 Paragraph 1.03 (B.) and shall become part of the contract requirements. Clause 6.2.3 makes reference to Appendix A6.4 for a sample commissioning specification which shall become part of the contract requirements and shall be edited to suit the work to be performed. The CA must meet the following qualifications:

a. Be employed by an AABC or NEBB certified firm.
b. Hold a management position in the firm, be able to represent the firm on all HVAC commissioning matters, and have a reputation of integrity with building owners, consultants and awarding authorities. The CA must have experience equal to either of

the following;

1. A Bachelor of Science engineering degree from an accredited college or university with a least five (5) years of experience in performing commissioning of HVAC systems prior to solicitation of this project or
2. A minimum of ten (10) years experience in commissioning of HVAC systems prior to solicitation of this project.
3. The CA sall have experience on a minimum of five (5) projects using the commissioning of facilities in accordance with ASHRAE Guideline 1 for the five phases indicated above. At least two of these projects shall be similar in size with similar HVAC systems to this project.
4. Names and experience of each team member assigned to this project. The person(s) performing each of the five phases shall be included and indicated that each person has performed the function for at least (3) years prior to solicitation of the project.

c. Become NEBB or AABC qualified and/or maintain NEBB or AABC qualification as a TAB supervisor for both AIR and HYDRONIC systems by passing appropriate written and practical TAB examinations.
d. Demonstrate Knowledge in the category or categories of HVAC commissioning.

10-17 **TRAINING**. The Contractor shall conduct a training course for the operating for all HVAC operating systems and individual items of equipment. The training program shall be conducted in accordance with Clause 11, Operations and Maintenance Training Program, in ASHRAE Guideline 1 in addition to the following requirements. The field instructions shall cover all of the items of equipment provided as well as the overall systems. The training period shall consist of a total of [8] [16] [__] hours of normal working time and shall start after the systems are functionally completed and testing,adjusting and balancing have been completed. Factory representatives shall be present to assist in training for every item of operating equipment provided. Contractor shall provide two copies of operation and maintenance instructions for each item of equipment provided. Training shall consist of startup, normal operation and shutdown, as well as demonstrations of routine maintenance operations. The Contracting Officer shall be notified at least 14 days prior to date of proposed conduction of the training course.

CHAPTER 11

ENERGY CONSERVATION

[The Installation shall determine which energy conservation alternatives are feasible and should be used. UEPH buildings should always consider heat recovery for the central preconditioned outside air system and dessicant cooling where applicable. Where life cycle cost effective, specify equipment efficiencies in the upper 25% of that available. In all cases, all equipment in the project shall, as a minimum, conform to FEMP or Energy Star criteria.]

11-1 **PASSIVE SOLAR APPLICATIONS**. Passive solar architectural applications shall routinely be considered as a part of all project designs. Unique applications such as attached sun spaces, earth sheltering, mass trombe walls, solar chimneys, solar dehumidifiers, and other innovations may be considered. Operational controls, such as shading and venting mechanisms, to control the amount of heat admitted into the building during the day, reduce the amount of heat escaping from the building at night, and provide for thermal comfort of the occupants, are parts of this system.

11-1.1 South glazing. If used as part of the solar energy system, glazing shall be of the commercially available off-the-shelf type and shall face within 20 degrees of solar south. The glazing shall be architecturally compatible with building design and the environment. It shall face directly into the living space so that the walls, floors, ceiling, and other massive objects can absorb the entering solar energy, and shall have a whole-window U value less than 1.6 square meter-kelvin (K)/watt [0.28 ft2-degrees F/BTUH].

11-1.2 Storage mass. If thermal performance calculations indicate a need for additional mass (beyond that provided by the building structure) substantiating data will be submitted. The storage mass will be well integrated into the building design. The thermal mass surface area in the space must be a minimum of three times the glazing area. Six to nine times the glazing area is recommended to control temperature swings. The surfaces to absorb solar energy must not be more than 10% covered.

11-1.3 Shading of Glazing. Cooling season shading of glazed surfaces on the east, west and south elevations is required.

11-2 **PRE-ENGINEERED ACTIVE SOLAR APPLICATIONS**. Pre-engineered active solar applications proposed for domestic water heating shall be evaluated for life-cycle-cost effectiveness using a recognized process design program. Whether site-mounted or unit-mounted, systems must be designed for maximum ease of maintenance and for architectural compatibility with the UEPH complex environment. .

11-3 **GEOTHERMAL**. Geothermal energy sources such as wet or dry steam sources, geothermal hot water, hot dry rock, etc., when determined cost effective, may be considered in regions with established geothermal sources. Each design utilizing geothermal sources shall address the project's environmental impact relating to discharge of hazardous, noncondensable gases or other hazardous effluents, noise emission, heat rejection, ground water contamination, land use, etc.

11-4 **WIND**. Wind power may be considered in regions where determined cost effective. Factors such as average wind speed, available wind power, and wind variability shall be considered when investigating the annual useful energy production potential.

11-5 **CONDENSER HEAT RECOVERY**. In regions authorized for cooling, consideration shall be given to installation of a heat exchanger to recover condenser heat and desuperheat for use in heating domestic water. A standard, domestic water heater shall be provided in conjunction with this system to provide hot water during the heating season. Heat pump water heaters can be considered in hot climates.

11-6 **ENERGY RECOVERY EQUIPMENT**.

11-6.1 Plate heat exchangers. Unit shall be a factory fabricated and tested assembly for stationary air-to-air energy recovery by transfer of sensible heat from exhaust air to supply air stream. Heat transfer surface shall be constructed of aluminum. Enclosure shall be fabricated from galvanized steel and shall include maintenance access provisions.

11-6.2 Rotary heat exchangers. Unit shall be a factory fabricated and tested assembly for air-to-air energy recovery by transfer of sensible heat from exhaust air to supply air stream. Device performance shall be according to ASHRAE 84. Exchange media shall be chemically inert, moisture-resistant, fire-retardant, laminated, nonmetallic material which complies with NFPA 90A. Exhaust and supply streams shall be isolated by seals which are static, field adjustable, and replaceable. Chain drive mechanisms shall be fitted with ratcheting torque limiter or slip-clutch protective device. Enclosure shall be fabricated from galvanized steel and shall include maintenance access provisions.

11-6.3 Heat recovery coils. Coil assembly shall be factory fabricated and tested air-to-liquid-to-air energy recovery system for transfer of sensible heat from exhaust air to supply air stream. System shall deliver an energy transfer effectiveness without cross-contamination with maximum energy recovery at minimum life cycle cost. Components shall be computer optimized for capacity, effectiveness, number of coil fins per inch, number of coil rows, flow rate and frost control. Coils, pumps, controls and piping materials shall conform to Chapter 10 – HVAC.

11-6.4 Heat pipe. Device shall be a factory fabricated, assembled and tested, counterflow arrangement, air-to-air heat exchanger for transfer of sensible heat between exhaust and supply streams. Device shall deliver an energy transfer effectiveness without cross-contamination. Heat exchanger tube core shall be seamless aluminum or copper tube with extended surfaces, utilizing wrought aluminum Alloy 3003 or Alloy 5052, temper to suit. Tubes shall be fitted with internal capillary wick, filled with an ASHRAE 15, Group 1 refrigerant working fluid, selected for system design temperature range, and hermetically sealed. Heat exchanger frame shall be constructed of not less than 16 gauge galvanized steel and fitted with intermediate tube supports, and flange connections. Tube end-covers and a partition of galvanized steel to separate exhaust and supply air streams without cross-contamination and in required area ratio shall be provided. [A drain pan constructed of welded Type 300 series stainless steel shall be provided.] Heat recovery regulation shall be provided by [system face and bypass dampers and related control system as indicated] [interfacing with manufacturer's standard tilt-control mechanism for summer/winter operation, regulating the supply air temperature and frost prevention on weather face of exhaust side at temperature indicated]. Coil shall be fitted with pleated flexible connectors.

11-6.5 Pretreatment of Outside Air for UEPH Buildings. Dessicant cooling and other methods should be considered for pretreatment of outside air for UEPH buildings.

11-7 **REBATES AND INCENTIVES**. Systems and techniques which take advantage of rebates and incentives offered by utilities are preferred and shall be stated by the government and local utility districts.

CHAPTER 12

FIRE PROTECTION

12-1 **DESIGN STANDARDS AND CODES**. The fire protection design for all facilities shall be in accordance with the current versions of the International Building Code and the National Fire Protection Association (NFPA) standards and codes.

12-1.1 **Fire Protection Engineer**. The contractor shall provide the services of a qualified registered fire protection engineer. The fire protection engineer shall be an integral part of the design team and shall be involved in all aspects of the design of the fire protection system.

12-1.2 **Fire Protection and Life Safety Analysis**. The fire protection engineer shall perform a fire protection and life safety design analysis of the proposed facility design. The analysis shall be submitted with the preliminary design submittal. The analysis shall include type of construction; height and area limitations; classification of occupancy; building separation or exposure protection; specific compliance with NFPA codes and the IBC; requirements for fire-rated walls, doors, fire dampers, etc.; analysis of automatic suppression systems and protected areas; water supplies; smoke control systems; fire alarm system, including connection to the base-wide system; fire detection system; standpipe systems; fire extinguishers; interior finish ratings; and other pertinent fire protection data. The submittal shall include a life safety floor plan showing occupant loading, occupancy classifications and construction type, egress travel distances, exit capacities, sprinklered areas, fire extinguisher locations, ratings of fire-resistive assemblies, and other data necessary to exhibit compliance with life safety code requirements.

12-2 **HYDRANT FLOW DATA**.

12-2.1 A preliminary hydraulic analysis performed by the Activity using [recent flow test data] [historical test data] indicates that […….] [the Activity preparing the RFP shall address the adequacy of the existing water supply to meet the demands of the fire protection system required.] Proposed design shall be based on current and accurate test data as described below.

12-2.2 Current hydrant flow test data shall be used in the hydraulic analysis and as the basis for the design of the sprinkler system, underground supply mains, and fire hydrants. [Select either option below for providing flow data.] [Based on a recent flow test taken at the hydrant located at [provide test location], there is [ ] kPa [psi] of static pressure and [ ] kPa [psi] of residual pressure at a flow of [ ] cubic meters per minute [gpm].] [The contractor shall conduct a water supply flow test to determine water supply available for the fire protection system and for hose streams and fire hydrants. The test must determine the static pressure and the residual pressure at a flow rate which is equal to or greater than the combined sprinkler and hose stream demand.]

12-3 **SPRINKLER SYSTEM**.

12-3.1 Wet pipe sprinkler system. [The entire building] [describe spaces to be sprinkled] shall be protected by a wet pipe sprinkler system. Sprinkler system shall be designed and installed in accordance with the provisions of NFPA 13, Standard for the Installation of Sprinkler Systems. UEPH building four stories or less may be protected by a wet pipe sprinkler system designed and installed in accordance with the provisions of NFPA 13R, except that buildings, which use the sprinkler system to increase allowable floor area based on particular construction

type, shall be designed and installed in accordance with the provisions of NFPA 13. Provide hydraulic calculations to support design of the system.

12-3.2 Dry pipe sprinkler system. Provide dry pipe sprinkler system for [describe spaces to be sprinkled]. Sprinkler system shall be designed and installed in accordance with the provisions of NFPA 13, Standard for the Installation of Sprinkler Systems. Provide hydraulic calculations to support design of the system.

12-3.1 Sprinkler Heads. All sprinkler heads located in finished areas shall be recessed pendent type.

12-4 **FIRE PUMP**.

12-4.1 Electric fire pump. Provide electric driven fire pump and controllers in accordance with NFPA 20.

12-4.2 Diesel fire pump. Provide electric driven fire pump and controllers in accordance with NFPA 20. Provide a diesel fuel tank in accordance with NFPA criteria.

12-5 **STANDPIPE AND HOSE SYSTEM**. Provide standpipe and hose system for all buildings in accordance with NFPA criteria.

12-6 **BUILDING CONSTRUCTION**. Comply with requirements of International Building Code and NFPA 101Life Safety Code.

12-6.1 **Fire Extinguishers and Cabinets**. Provide portable fire extinguishers in accordance with NFPA 10. Provide semi-recessed aluminum fire extinguisher cabinets with clear view panel in public areas, and where indicated in functional and area requirements. Provide fire-rated cabinets in fire-rated wall assemblies.

12-6.2 **Interior Wall and Ceiling Finishes**. Wall and ceiling finishes and movable partitions shall conform to the requirements of the IBC and NFPA 101, except as follows [The following, more stringent, interior finish requirements are included to comply with MilHdbk 1008C, Fire Protection for Facilities Engineering, Design, and Construction]:

12-6.2.1 Interior finish for exits, exit passageways, sleeping rooms shall be Class A only.

12-6.2.2 Flame spread (FS) and smoke development (SD) shall be tested in accordance with ASTM E84. Tests shall not exceed FS rating of 25 and SD rating of 50 for Class A materials; FS rating of 75 and SD rating of 100 for Class B materials; and FS rating of 200 and SD rating of 200 for Class C materials. Class C materials shall only be permitted in fully sprinklered buildings.

12-6.2.3 Cellular plastics shall not be used as interior wall and ceiling materials.

12-6.2.4 Carpeting and other textile wall coverings shall only be applied as an interior finish if the material passes the acceptance criteria of the Uniform Building Code (UBC) Standard 8-2, Test Method for Textile Wall Coverings, conducted by a nationally recognized testing laboratory.

12-7 **FIRE ALARM**. Provide fire alarm and detection system conforming to requirements of NFPA 72 and NFPA 101. Fire alarm system shall be addressable (intelligent) and consist of

smoke and/or heat detectors, pull stations, audiovisual devices, control/annunciation panel and tamper and/or flow connection/supervision to the sprinkler system. Heat detectors are not required in UEPH buildings. Provide supervision of fire pump where fire pump is provided. [Fire alarm system shall tie into the base-wide system.]

12-7.1 [Design Activity shall provide detailed information on the existing base-wide fire alarm system if one exists.]

CHAPTER 13

SUSTAINABLE DESIGN

13-1 **SUSTAINABLE DESIGN GOALS**. The goals for improving the sustainability of facilities include: (a) use resources efficiently and minimize raw material resource consumption, including energy, water, land and materials, both during the construction process and throughout the life of the facility, (b) maximize resource reuse, while maintaining financial stewardship, (c) move away from fossil fuels towards renewable energy sources, (d) create a healthy and productive work environment for all who use the facility, (e) build facilities of long-term value, and (f) protect and, where appropriate, restore the natural environment.

13-2 **PROJECT REQUIREMENTS**. Sustainable design techniques shall be considered as they relate to site and building design, construction, operation, and deconstruction. Techniques which conserve energy, improve livability, and can be justified by life cycle cost analysis as cost effective are encouraged.

13-2.1 Sustainable design is a proposal evaluation factor. The level of incorporation of sustainable design principles will be measured through use of the Army developed Sustainable Project Rating Tool (SPiRiT), available from the following website: www.cecer.army.mil/sustdesign .

13-2.2 Each offeror will complete and submit the SPiRiT Facility Points Summary with the proposal; the total point score will determine the SPiRiT Sustainable Project Certification Level: SPiRiT Bronze, Silver, Gold, or Platinum. The certification level will be used as a proposal evaluation factor as defined in RFP Section 00120 – Proposal Evaluation and Contract Award.

13-2.3 Proposals that do not achieve a SPiRiT Bronze certification level will be considered non-conforming.

13-2.4 Proposals that do not comply with the “Required” criteria listed in the SPiRiT document will be considered non-conforming. For example: SPiRiT category *3.R3 CFC Reduction in HVAC&R Equipment* requires zero use of CFC-based refrigerants in new mechanical systems. Although no credit points are available, the requirement must be met to achieve the minimum certification level.

13-2.5 Some SPiRiT categories award potential points (credits) for strategies or decisions that are not within the control of the Offeror. These areas may include installation master planning, site selection, or involving facility users in the programming process. The Offeror will receive points in the following credit categories for criteria met by the government: [insert the credits earned by government actions that are not within the scope of the proposal requirements. Especially look at SPiRiT categories *1.C1 Site Selection, 1.C2 Installation/Base Redevelopment, 1.C10 Facility Impact, and 6.C1 Holistic Delivery of Facility*]. Other than the credits stated in this paragraph, the Offeror shall not receive points for any SPiRiT criteria that cannot be substantiated by information contained in the proposal.

APPENDIX A

REFERENCES

GOVERNMENT PUBLICATIONS:

Code of Federal Regulations
Government Printing Office
Washington, DC 20402

49 CFR 192 Transportation of Natural and other Gas by Pipeline: Minimum Federal Safety Standards

40 CFR 280 Owners and Operators of Underground Storage Tanks

49 CFR 195 Transportation of Hazardous Liquids by Pipeline

10 CFR 430 Energy Conservation Program for Consumer Products

Department of the Navy

Standardization Documents Order Desk
700 Robbins Avenue, Bldg. 4D
Philadelphia, PA 19111-5094

MIL-HDBK-1008, Fire Protection for Facilities Engineering, Design, and Construction

U.S. Government Printing Office

Superintendent of Documents
U.S. Government Printing Office
Washington, DC 20402

U.S. Government Printing Office (GPO) Style Manual

NON-GOVERNMENT PUBLICATIONS:

Air Movement and Control Association
30 W. University Drive
Arlington Heights, IL 60004-1893

AMCA 210 (1985) Laboratory Methods of Testing Fans for Rating

Air Conditioning and Refrigeration Institute
4301 North Fairfax Drive
Arlington, VA 22203

ARI 310/380 (1993) Packaged Terminal Air-Conditioners and Heat Pumps

ARI 440 (1998) Room Fan-Coil and Unit Ventilator

	ARI 445 (1987; R 1993) Room Air-Induction Units
	ARI 880 (1998) Air Terminals
American Architectural Manufacturers Association (AAMA) 1827 Walden Office Square, Suite 104 Schaumburg, IL 60173-4268	AAMA 101 Voluntary Specifications for Aluminum, Vinyl and Wood Windows and Glass Doors
	AAMA 605 Voluntary Specification Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels
	AAMA 607.1 Voluntary Guide Specifications and Inspection Methods for Clear Anodic Finishes for Architectural Aluminum
	AAMA 1503 Voluntary Test Method for Thermal Transmittance and Condensation Resistance of Windows, Doors, and Glazed Wall Sections
American Bearing Manufacturers Association 1200 19th Street, NW Washington, DC 20036-4303	AFBMA Std 9 (1990) Load Ratings and Fatigue Life for Ball Bearings
	AFBMA Std 11 (1990) Load Ratings and Fatigue Life for Roller Bearings
American Boiler Manufacturers Association (ABMA) 950 N. Glebe Rd, Suite 160 Arlington, VA 22203-1824	ABMA ISEI Industry Standards and Engineering Information
American National Standards Institute 11 West 42 Street New York, NY 10036	ANSI Z21.10.1 (1993; Z21.10.1a; Z21.10.1b; Z21.10.1c) Gas Water Heaters Vol. I, Storage Water Heaters with Input Ratings of 75,000 Btu Per Hour or Less
	ANSI Z124.3 (1995) American National Standard for Plastic Lavatories.
	ANSI Z124.6 (1997) Plastic Sinks
	ANSI Z21.45 (1995) Flexible

	Connectors of Other Than All-Metal Construction for Gas Appliances
	ANSI C2 (1997) National Electrical Safety Code
	ANSI 70 (1996) National Electrical Code
	ANSI/TIA/EIA-569-A (1998) Commercial Building Standard for Telecommunications Pathways and Spaces
American Society for Testing and Materials 100 Bar Harbor Drive West Conshohocken, PA 19428-2959	ASTM E84 (2000) Surface Burning Characteristics of Building Materials
	ASTM D 2846/D 2846M (1999) Chlorinated Poly(Vinyl Chloride) (CPVC) Plastic Hot- and Cold-Water Distribution Systems
	ASTM D 2513 (1999; Rev. A) Thermoplastic Gas Pressure Pipe, Tubing, and Fittings
	ASTM D 2683 (1998) Socket-Type Polyethylene Fittings for Outside Diameter-Controlled Polyethylene Pipe and Tubing
	ASTM A 53 (1999) Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless
	ASTM A 106 (1999) Seamless Carbon Steel Pipe for High-Temperature Service
	ASTM B 88 (1999) Seamless Copper Water Tube
	ASTM D 5686 (1995) "Fiberglass" (Glass-Fiber-Reinforced Thermosetting-Resin) Pipe and Pipe Fittings, Adhesive Bonded Joint Type Epoxy Resin, for Condensate Return Lines

	ASTM D 2241 (1996b) Poly(Vinyl Chloride) (PVC) Pressure-Rated-Pipe (SDR Series)
	ASTM D 1784 (1999a) Rigid Poly(Vinyl Chloride) (PVC) Compounds and Chlorinated Poly(Vinyl Chloride) (CPVC) Compounds
	ASTM D 1248 (1998) Polyethylene Plastics Molding and Extrusion Materials
	ASTM C 591 (1994) Unfaced Preformed Rigid Cellular Polyisocyanurate Thermal Insulation
	ASTM C 518 (1998)Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus
	ASTM A 134 (1996) Pipe, Steel, Electric-Fusion (Arc)-Welded (Sizes NPS 16 and Over)
	ASTM A 135 (1997c) Electric-Resistance-Welded Steel Pipe
	ASTM A 139 (1996el) Electric-Fusion (Arc)-Welded Steel Pipe (NPS 4 and over)
	ASTM A 36/A 36M (2000) Carbon Structural Steel
	ASTM D 2310 (1997) Machine-Made "Fiberglass" (Glass-Fiber-Reinforced Thermosetting-Resin) Pipe
	ASTM D 2996 (1996; Rev. A) Filament-Wound "Fiberglass" (Glass-Fiber-Reinforced Thermosetting Resin) Pipe
American Society of Heating, Refrigerating and Air Conditioning Engineers 1791 Tully Circle. NE	ASHRAE 90.1 (1989; 90.1b; 90.1c; 90.1d; 90.1e; 90.1g; 90.1i 90.11-1995; 90.1m-1995; 90.1n-1997) Energy Efficient

Atlanta, GA 30329-2305	Design of New Buildings Except Low-Rise Residential Buildings
	ASHRAE Hdbk-IP (1997) Handbook, Fundamentals I-P Edition
American Society of Mechanical Engineers International Three Park Place New York, NY 10016-5990	ASME B31.8 (1995) Gas Transmission and Distribution Piping Systems
	ASME B16.11 (1996) Forged Fittings, Socket-Welding and Threaded
	ASME B31.1 (1998; Addenda 1999 and 2000) Power Piping
	ASME BPVC SEC VII (1995; Addenda 1995, 1996, and 1997) Boiler and Pressure Vessel Code: Section VII Recommended Guidelines for the Care of Power Boilers
	ASME (1996) Pipe Flanges and Flanged Fittings NPS 1/2 Through NPS 24
Architectural Woodwork Institute 1952 Isaac Newton Square W. Reston, VA 20190	AWI Quality Standards (1999) 7th Edition, Version 1.2
Associated Air Balance Council 1518 K Street NW, Suite 708 Washington, DC 20005	AABC MN-1 (1989) National Standards for Testing and Balancing Heating, Ventilating, and Air Conditioning Systems
Builders Hardware Manufacturers Association 355 Lexington Ave, Suite 1700 New York, NY 10017-6603	ANSI/BHMA A156.4 (2000) American National Standards for Door Controls - Closers…
Council of American Building Officials 5203 Leesburg Pike, Suite 708 Falls Church, VA 22041	CABO A117.1 (1992; Errata Jun 1993) Accessible and Usable Buildings and Facilities
Electronic Industries Association (EIA) 2500 Wilson Blvd Arlington, VA 22201-3834	EIA/TIA 568-B (2001) Commercial Building Telecommunications Cabling Standards

	EIA/TIA 569-A (2001, amendment 5) Commercial Building Standard for Telecommunications Pathways and Spaces
Illuminating Engineering Society of North America 120 Wall Street, 17th Floor New York, NY 10005-4001	IESNA RP-8 (1983; R 1993) Roadway Lighting
	IES LHBK (1993) Lighting Handbook, Reference and Application
Institute of Electrical and Electronics Engineers Inc. (IEEE) 445 Hoes Lane, P.O. Box 1331 Piscataway, NJ 08855-1331	Standard for Use of the International System of Units (SI): the Modern Metric System
International Approval Services (IAS) 8501 E. Pleasant Valley Rd Cleveland, OH 44131	IAS Directory (1999) IAS Directory of AGA & CGA Certified Appliances and Accessories
International Association of Plumbing and Mechanical Officials 20001 Walnut Drive South Walnut, CA 91789-2825	IAPMO Z124.1 (1995) Plastic Bathtub Units
	IAPMO Z124.3 (1995) Plastic Lavatories
	IAPMO Z124.5 (1997) Plastic Toilet (Water Closets) Seats
	IAPMO Z124.9 (1994) Plastic Urinal Fixtures
International Code Council, Inc. 5203 Leesburg Pike, Suite 708 Falls Church, VA 22041-3401	ICC (2000) International Building Code
International Conference of Building Officials 5360 Workman Mill Road Whittier, CA 90601-2298	ICBO (1997) Uniform Building Code
National Association of Corrosion Engineers International 1440 South Creek Drive Houston, TX 77084-4906	NACE RP0169 (1996) Control of External Corrosion on Underground or Submerged Metallic Piping Systems
	NACE RP0185 (1996) Extruded, Polyolefin Resin Coating Systems with Soft Adhesives for Underground or

	Submerged Pipe
National Association of Plumbing - Heating – Cooling Contractors 180 S. Washington Street Falls Church, VA 22046	NAPHCC Plumbing Code (1996) National Standard Plumbing Code
National Electrical Manufacturers Association 1300 N 17th Street, Suite 1847 Rosslyn, VA 22209	NEMA C12.1 (1995) Code for Electricity Metering
	NEMA LD3 High Pressure Decorative Laminates
	NEMA PB 1 (1995) Panelboards
National Environmental Balancing Bureau 8575 Grovemont Circle Gaithersburg, MD 20877-4121	NEBB Procedural Stds (1991) Procedural Standards for Testing Adjusting Balancing of Environmental Systems
National Fire Protection Association One Batterymarch Park Quincy, MA 02269-9101	NFPA 10 (1998) Standard for Portable Fire Extinguishers
	NFPA 30 (2000) Flammable and Combustible Liquids Code
	NFPA 31 (1997; TIA 97-11) Installation of Oil Burning Equipment
	NFPA 54 (1999) National Fuel Gas Code
	NFPA 58 (1998; Errata 58-98-1) Liquefied Petroleum Gas Code
	NFPA 70 (1999) National Electrical Code
	NFPA 80 (1999) Standard for Fire Doors and Fire Windows
	NFPA 90A (1993) Installation of Air Conditioning and Ventilating Systems
Plumbing and Drainage Institute 45 Bristol Drive, Suite 101 South Easton, MA 02375	PDI G 101 (1996) Testing and Rating Procedure for Grease Interceptors with Appendix of Sizing and Installation Data
	PDI WH201 (1992) Water Hammer Arrestors

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Sheet Metal and Air Conditioning Contractor's National Association
PO Box 221230
Chantilly, VA 20153-1230

SMACNA HVAC Duct Const Stds (1995; Addenda Nov 1997)) HVAC Duct Construction Standards - Metal and Flexible

SMACNA Arch. Manual (1993; Errata; Addenda Oct 1997) Architectural Sheet Metal Manual

Steel Door Institute (SDI)
30200 Detroit Road
Cleveland, OH 44145-1967

ANSI A250.8/SDI 100 Standard Steel Doors and Frames

Steel Tank Institute (STI)
570 Oakwood Rd
Lake Zurich, IL 60047

STI P3 Underground Steel Storage Tank Protection

Underwriters Laboratories
333 Pfingsten Road
Northbrook, IL 60062-2096

UL 430 (1994; Rev thru Nov 1996) Waste Disposers

UL 567 (1996; Rev thru Oct 1997) Pipe Connectors for Petroleum Products and LP-Gas

UL 1746 (1993; Rev thru Sep 1998) External Corrosion Protection Systems for Steel Underground Storage Tanks

UL 1995 (1995; Rev thru Aug 1999) Heating and Cooling Equipment

UL 507 (1999) Electric Fans

UL 608 Modular Vault Panels

UL 746C (1995; Rev thru Jul 1999) Polymeric Materials - Use in Electric Equipment Evaluations

UL 705 (1994; Rev thru Feb 1999) Power Ventilators

UL 1316 (1994; Rev Apr 1996) Glass-Fiber-Reinforced Plastic Underground Storage Tanks for Petroleum Products, Alcohols, and Alcohol-Gasoline Mixtures